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On some Undescribed and Imperfectly known Indian Species of *Primula* and *Androsace*.

By George Watt, M.B., C.M., F.L.S., Professor of Botany, Bengal Educational Service, Calcutta.

[Read April 21, 1881.]

(Plates I.–XVIII.)

[*Preliminary Note by* Sir J. D. Hooker.—During a brief furlough in England, passed at Kew, Dr. Watt commenced a study of the Indian species of *Primula* and *Androsace*, which he intended, when completed, to lay before the Linnean Society. His recall to India prevented his completion of the task, and gave him the opportunity of collecting in the Sikkim Himalaya (which has proved to be the richest province of the Order hitherto known) new species and additional information and observations, which he at once transmitted to Kew. Meanwhile the advance of the 'Flora of British India' having rendered it necessary that the description of the whole Order should be taken up for that work, Dr. Watt obligingly made over his materials to me with the request that I should deal with them as I thought best. Under these circumstances, finding that the value and interest of Dr. Watt's labours centred in the number of new and remarkable species which he had provisionally named and, for the most part, accompanied with more or less complete diagnoses, I have with his approval reexamined his material, revised his characters, and offer them in accordance with his intentions, and in his name, to the Linnean Society.—J. D. H.]

Introductory Remarks.—Before proceeding to the description of the Indian species of *Primula*, a few words on the composition and geographical distribution of the genus may not be out of place. Altogether the genus comprises nearly one hundred species, which inhabit the temperate and cold regions of the Northern hemisphere, one only being found, and that in great abundance, in the Southern hemisphere on the shores of Fuegia and in the Falkland Islands *. This is the most remarkable feature in the distribution of the genus, inasmuch as it is not known to be otherwise represented in the country intervening between the mountains of New Mexico and the extreme south of Patagonia—a break of about 5000 miles. *P. farinosa* has the widest range of any species in the northern hemisphere, inhabiting the mountains of Europe from the Pyrenees eastward and northward, Central Asia, the mountains of North India, Japan, and North America from Labrador and Nova Scotia northward and westward to the Rocky Mountains, advancing southward along this range to Colorado. An interesting fact in the wide and interrupted distribution of *P. farinosa*, is the comparatively slight variation it exhibits throughout its range. The distribution of the genus in the northern hemisphere offers some other noteworthy features. In round numbers, about forty species inhabit Europe, about the same number the mountains of North India, nine occur in North America, eight are recorded from Japan and China, one from the mountains of Java, one from Abyssinia, and Central Asia possesses a few endemic species in addition to those that are common to it and other regions. Of the nine North-American species, five also occur in North Asia or Europe, and three (very distinct species) are peculiar to the lofty mountains of Colorado, Arizona, and the adjoining territories. On the eastern side of the continent only one species occurs as far south as Vermont and New York, where it reaches its southern limit. The Abyssinian species are endemic; they differ from all others except the Himalayan *P. floribunda* in the complicate vernation of the leaves, a character only to be detected in their very young state; and it may be mentioned that no species has hitherto been discovered in the Deccan. Another interesting fact is the existence of two great centres of concentration of species, namely the mountains of Central Europe and of North India; and although some of the species of the two regions overlap in the intervening country, two only seem to be common to both regions. Of the Himalayan species, the only one besides *P. farinosa* that has a wide range outside of India is *P. sibirica**. This inhabits Central and Northern Asia and Arctic America from Kamtschatka to Greenland. Most of the species of this region are endemic, and some of them apparently local, whilst others extend from Sikkim to the north-west, and are so variable that they are difficult to define. A large number of forms have been referred to *P. denticulata*, *P. Stuartii*, and *P. petiolaris*, whether rightly or wrongly could not be determined. On the other hand, some forms have been raised to the rank of species, because with our present material they are readily distinguished. Whatever rank we assign them, the numerous forms of *Primula* constitute one of the most charming and characteristic features of the alpine vegetation of Northern India.

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* This, the *P. magellanica*, Lehm., was identified by the late H. C. Watson and Sir J. Hooker ('Flora Antarctica,' i. 337) with *P. farinosa*, from which, however, Sir J. Hooker informs me it is abundantly distinguished by the sessile white flowers and the large tuberculated seeds.

1. PRIMULA, *L.*

A. Leaves on long slender unwinged petioles, orbicular oblong or cordate, margins revolute in vernation. (See also *P. tibetica.*)

1. P. GAMBELIANA, *Watt*; gemmis farinosis, foliis ¼–1 poll. diam., orbiculari-cordatis dentatis, umbellis paucifloris, bracteis 1–3 subulatis, corolla purpurea, ore obscure annulato, lobis orbicularibus emarginatis. (TAB. I.)

SIKKIM HIMALAYA: Jongri, alt. 14,000 ft., *G. Watt.*

Allied to *P. rotundifolia*, but much smaller, with fewer and larger flowers. *Leaves* membranous, resembling those of *P. pulchra*, but not sheathed with large fleshy scales at the base. *Sçape* and *inflorescence* quite glabrous. *Corolla-limb* concave, 1–1¼ inch diam. *Ovary* and *stigma* as in *P. rotundifolia. Fruit* unknown.

PLATE I. fig. 1, whole plant, *nat. size.* 2, calyx; 3, corolla laid open; 4, ovary: *all enlarged.*

2. P. PULCHRA, *Watt*; glaberrima, efarinosa, caule vaginis

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* Sir J. Hooker informs me that he is convinced that a revision of the genus will result in the identification of several of the Western Himalayan species with North Asiatic and even European ones.

elongatis instructo, foliis oblongis v. ovato-oblongis subtus glaucis basi rotundatis cordatisve, apice rotundatis, marginibus undulatis, scapo brevi 2–10-floro, bracteis membranaceis filiformibus v. subulatis, floribus laxe umbellatis, corolla purpurea, tubo infundibulari, ore obscure annulato, lobis latis obcordatis. (Tab. II. A.)

Sikkim Himalaya: Lachen, alt. 12,000–14,000 ft., *J. D. Hooker*; Jongri, *Watt.*

Sheaths 1–1½ inch long, embracing the petioles. *Leaves* few, blade 1–1½ inch, midrib stout, nerves few; petiole 1–1½ inch. *Scape* about equalling the petiole; bracts much shorter and more slender than the very unequal pedicels. *Calyx* ¼–⅓ inch, terete. *Corolla* very large for the size of the plant, ¾–1 inch diam. *Ovary* globose, subacute; stigma globose. *Fruit* unknown.

Plate II. A. fig. 1, plant, *nat. size.* 2, top of scape and bracts; 3, calyx; 4, portion of corolla laid open; 5, ovary: *all enlarged.*

3. P. vaginata, *Watt*; puberula v. glabrata, efarinosa, foliis ½ poll. diam. orbicularibus profunde cordatis 7-lobis, petiolo basi lata vaginante, scapo 2–4-pollicari 3–6-floro, pedicellis inæquilongis, bracteis linearibus, calycis lobis brevibus, corolla lilacina, tubo infundibulari, ore annulato, lobis 2–4-fidis. (Tab. II. B.)

Sikkim Himalaya: La Ghep, alt. 10,000 ft., *C. B. Clarke.*

Rootstock small, woody. *Petiole* abruptly dilated at the base into the broad membranous sheath. *Scape* glabrous; pedicels ¼–⅓ inch. *Calyx* campanulate; lobe ovate, acute. *Corolla-tube* not twice the length of the calyx; limb ⅓ inch diam. *Ovary* globose, acute. *Fruit* unknown.

Plate II. B. fig. 1, whole plant, *nat. size.* 2, leaf; 3, bract; 4, calyx; 5, portion of corolla laid open: *all enlarged.*

4. P. Clarkei, *Watt*; glaberrima, foliis 1–1½-pollicaribus orbiculari- v. elliptico-cordatis dentatis v. crenatis apice rotundatis, scapo 0, pedicellis petiolos sæpe æquantibus, calyce late campanulato, lobis brevibus, corollæ tubo gracili, ore exannulato, limbo plano, lobis 2-fidis, capsula globosa inclusa. (Tab. III. B.)

Kashmir: at Poosiana, alt. 7000 ft., *C. B. Clarke.*

A very singular species, with the habit of *Viola palustris. Rootstock* slender, woody. *Leaves* membranous, nerves very ender; petiole 2–4 inches, very slender, base narrowly sheathing. *Pedicels* 2–3, very slender. *Corolla-tube* ⅓ inch, lobes

narrow. *Ovary* globose, acute; stigma capitate. *Seeds* subglobose, black, minutely papillose, $\frac{1}{40}$ inch diam.

PLATE III. B. fig. 1, plant, *nat. size*; 2, calyx, *enlarged.*

5. P. FILIPES, *Watt*; sparse pubescens, efarinosa, foliis 1–1½ poll. diam., ovato-oblongis v. orbiculari-cordatis integerrimis lobulatis v. dentatis, petiolo gracillimo, scapo 6–8-floro foliis breviore, calycis lobis latis, corolla carnea, ore exannulato, limbo plano, capsula globosa inclusa, seminibus minimis lævibus.—Primula, *Griff. Itin. Notes,* 123. n. 396; *Notul.* iv. 299; *Ic. Pl. Asiat.* t. 485. f. 1. (TAB. III. A.)

BHOTAN: on rocks near Chuka, alt. 6500 ft., *Griffith.*

Rootstock long, woody. *Leaves* membranous. *Scape* about equalling the petioles, slender in flower, thickened in fruit; bracts small, subulate. *Calyx* broadly campanulate. *Corolla-tube* ⅓ inch, three times as long as the calyx, funnel-shaped; limb as much broad; lobes obovate, 2-lobed. *Seeds* $\frac{1}{60}$ inch, dark brown, obtusely angled.—Closely allied to the Chinese *P. obconica,* Hance (*P. poculiformis,* Hook. f., Bot. Mag. t. 6582), but a much smaller and more delicate plant, with a longer corolla-tube.

PLATE III. A. fig. 1, plant, *nat. size.* 2, bracts; 3, calyx; 4, portion of corolla laid open: *all enlarged.*

B. Leaves sessile, or base narrowed into a broad winged petiole, margins revolute in vernation. (Petiole sometimes slender: *P. tibetica.*)

6. P. HEYDEI, *Watt*; parvula, stolonifera, foliis ¼–½-pollicaribus sessilibus lanceolatis acuminatis grosse dentatis subtus farinosis, scapo valido 5–∞-floro, floribus sessilibus, bracteis parvis basi saccatis, corollæ tubo calyce longiore, limbo plano. (TAB. IV. C.)

WESTERN TIBET: alt. 12,000–14,000 ft., *T. Thomson*; Taglang, *Heyde.*

Densely tufted; stolons short, leafy. *Leaves* rosulate or erect, those on the stolons subsecund; teeth often subrecurved. *Scape* 1–4 inches, strict, and inflorescence mealy. *Calyx* campanulate, cleft to the middle. *Corolla* pale lilac, ⅓ inch diam. *Capsule* included, oblong. *Seeds* $\frac{1}{50}$ inch, pale, obtusely angled, minutely papillose.

PLATE IV. C. fig. 1, plant, *nat. size.* 2, leaf; 3, bracts; 4, calyx: *all enlarged.*

7. P. CONCINNA, *Watt*; dense cæspitosa, pusilla, foliis ½–1-

pollicaribus, oblanceolatis acutis v. obtusis integerrimis v. crenulatis subtus farinosis, scapo brevi 2–4-floro, pedicellis fructu elongatis, bracteis basi gibbis, calyce corollæ tubum brevem æquante, ore corollæ contracto annulato, limbo plano, lobis obcordatis. (TAB. IV. A.)

SIKKIM HIMALAYA: on the Tibetan passes, alt. 15,000–17,000 ft., *J. D. Hooker*, *G. Watt.*

Tufts ½ inch high. *Leaves* narrowed into the short petiole. margins revolute. *Scape* rarely longer than the leaves; bracts linear-oblong, much shorter than the pedicels, which in fruit often much exceed the scape. *Corolla* ¼ inch diam., pink or white. *Capsule* $\frac{1}{6}$ inch long, cylindric-oblong. *Seeds* nearly orbicular, $\frac{1}{50}$ inch diam., a little flattened on one side, quite smooth, pale brown.—This resembles a reduced state of *P. farinosa*; but, besides the smaller size, the longer capsules, shorter corolla-tube, and flattened seeds well distinguish it.

PLATE IV. A. fig. 1, plant, *nat. size.* 2, calyx; 3, portion of corolla laid open; 4, ovary; 5, calyx and capsule: *all enlarged.*

8. P. TIBETICA, *Watt*; pumila, cæspitosa, efarinosa, foliis ⅓–½-pollicaribus petiolatis coriaceis ellipticis acutis v. obtusis integerrimis, scapo brevissimo 1–5-floro, bracteis linearibus basi gibbis, pedicellis scapo multo longiore, calyce tubuloso corollæ tubum æquante, corollæ ore annulato, limbo plano, lobis profunde obcordatis. (TAB. XI. A.)

TIBETAN frontier of the Himalaya: Gyanama, north of Kumaon, alt. 15,500 ft., *Strachey & Winterbottom*; Kangra Lama, north of Sikkim, alt. 16,000–17,000 ft., *J. D. Hooker*.

Whole plant 1–3 inches high, quite glabrous. *Leaves* longer than the scape, usually obtuse, coriaceous, quite entire, nerves very indistinct, base rounded or acute; petiole slender, not winged. *Scape* 1–5-flowered; bracts linear-oblong, erect, produced downwards into a gibbosity; pedicels much longer than the scape, often six times as long, erect, stiff. *Calyx* 5-angled, shortly cleft, lobes obtuse. *Corolla* pale pink, tube equalling the calyx; limb ⅓ inch diam.; lobes broadly deeply obcordate. *Ovary* oblong. *Capsule* cylindric, more or less exserted.—This is a near ally of *P. sibirica*, from which it conspicuously differs in the small size, singular shortness of the scape, and great length of the pedicels. The Kangra-Lama and Gyanama specimens entirely accord.

PLATE XI. A. fig. 1, plant, *nat. size.* 2, bracts; 3, portion of corolla laid open; 4, ovary; 5, calyx and capsule: *all enlarged.*

9. P. GLABRA, *Klatt in Linnæa*, xxxvii. p. 500; inflorescentia farinosa, foliis ½–1-pollicaribus obovato-spathulatis acutis v. obtusis erosis v. dentatis, scapo gracili laxi- v. densifloro, floribus sessilibus v. breviter pedicellatis, bracteis brevibus basi gibbosis, calyce campanulato lobis brevibus late obovatis obtusis, corolla exannulata, lobis brevibus bifidis. (TAB. IV. B.)

SIKKIM HIMALAYA, alt. 13,000–15,000 ft., *J. D. Hooker, C. B. Clarke, G. Watt.*

Tufted, 1½–3 inches high. *Leaves* rosulate, spreading, small for the size of the plant, ½–1 inch long, rather thin, rigid when dry, tip rounded, base narrowed into a broad or slender petiole, teeth horizontal or recurved. *Scape* tall in comparison with the leaves, slender, erect, usually many-flowered; bracts subulate, very small, base gibbous; flowers small, often in a rounded head. *Calyx* very different from any allied species, the broad lobes not one third the length of the tube, and as long as the corolla-tube. *Corolla* blue-purple, limb ⅙–¼ inch diam. *Capsule* oblong, included. *Seeds* coarsely papillar.—This remarkable little species resembles *P. pusilla*, Wall., in habit; but the bracts are very different, and the mouth of the corolla is glabrous.

PLATE IV. B. fig. 1, plant, *nat. size.* 2, bracts; 3, calyx; 4, portion of corolla laid open, with ovary and stamen; 5, seed: *all enlarged.*

10. P. OBTUSIFOLIA, *Royle, Ill.* p. 311, t. 77. f. 1; efarinosa v. foliis subtus et inflorescentia farinosis, foliis 2–6-pollicaribus obovatis v. elliptico-spathulatis acutis v. obtusis integris crenatis erosis v. grosse dentatis, basi angustatis v. cordatis, petiolo late alato, scapo robusto plurifloro, bracteis ovatis v. subulatis basi sæpe connatis, corollæ purpureæ tubo calyce duplo longiore, ore annulato, lobis obcordatis, ovario acuto, capsula globosa calyci immersa. *Duby in DC. Prod.* viii. 42. (TAB. V.)

EASTERN and WESTERN TEMPERATE HIMALAYA: from Kunawur (*Royle*) to Bhotan (*Griffith*), ascending to 12,000 ft. in Sikkim.

Rootstock stout, fleshy. *Leaves* very variable. *Scape* 6–10 inches; bracts ¼–⅓ inch; pedicels ½–1½ inch, stout in fruit. *Calyx* usually mealy, cupular or broadly campanulate in fruit; lobes

triangular-ovate or linear-oblong, acute or obtuse. *Corolla* bright purple, limb $\frac{2}{3}$–1 inch diam., often puberulous. *Seeds* large, $\frac{1}{20}$ inch diam., subglobose, coarsely papillose.

Entire-leaved specimens of this fine species resemble at first sight broad-leaved states of *P. Stuartii*, var. *purpurea*, from which the thin texture of the leaves, the acute top of the ovary, and the capsule at once distinguish it. There are two forms of it, an Eastern and a Western, of which the Western extends to and overlaps the Eastern. Though differing at first sight, their differences reside only in the leaves, and these present intermediate states.

Var. 1. *Roylei*; foliis obovato-spathulatis obtusis erosis v. subintegris subtus farinosis.—Kunawur to Sikkim.

Var. 2. *Griffithii*, Watt; foliis ovato-cordatis acutis grosse dentatis.—Bhotan, *Griffith*; Sikkim, *J. D. Hooker*.

PLATE V. fig. 1, plant, *nat. size*. 2, bracts on scape; 3, bract; 4, calyx; 5, ovary: *all enlarged*.

11. P. ELONGATA, *Watt*; foliis longe petiolatis 3–5-pollicaribus membranaceis obovatis v. oblanceolatis obtusis crenulatis subtus farinosis v. concoloribus, scapo gracili paucifloro, floribus subsessilibus, bracteis brevibus subulatis basi simplicibus, calyce angusto ad medium 5fido, lobis lanceolatis, corollæ aureæ tubo valde elongato fauce infundibulari exannulata, lobis rotundato-obcordatis crenatis, ovario subacuto. (*Herb. Ind. Or., Hook. f. & Thoms.*, Primula, no. 14.) (TAB. VI.)

SIKKIM HIMALAYA: Zemu valley, alt. 12,000–13,000 ft., *J. D. Hooker*.

Rootstock stout, tuberous, giving off broad fleshy sheaths with membranous margins which embrace the petioles. *Leaves* $\frac{2}{3}$–$1\frac{1}{2}$ inch diam., narrowed into the winged, rarely slender petiole, midrib stout, nerves slender, crenatures regular. *Scape* stout, twice as long as the leaves, upper part and inflorescence mealy, 6–8-flowered; bracts subulate from a broad base; pedicels very short. *Calyx* cleft halfway down into narrow lobes, much shorter than the corolla-tube. *Corolla* golden yellow, tube twice as long as the calyx and expanding into a funnel-shaped throat, together $\frac{3}{4}$ inch long.—This more resembles *P. obtusifolia* perhaps than any other other species, from which the long corolla-tube and throat and crenate lobes distinguish it. It was collected by Sir J. Hooker in 1849 and never since.

PLATE VI. fig. 1, plant, *nat. size.* 2, bracts; 3, calyx; 4, portion of corolla laid open; 5, ovary: *all enlarged.*

12. P. KINGII, *Watt*; glaberrima, efarinosa, foliis confertis 2–3-pollicaribus elliptico-lanceolatis acutis integerrimis v. obscure crenulatis, petiolo late vaginante membranaceo, costa valida, scapo gracili elongato 4–5-floro, bracteis e basi lata subulatis, pedicellis brevibus puberulis, calyce anguste subcampanulato, corolla rubro-purpurea late infundibulari puberula breviter 5-loba, limbo concavo, lobis retusis intus glabris. (TAB. VII.)

SIKKIM HIMALAYA: at Natong (*Herb. Hort. Calcutt.*).

Leaves spreading, subcoriaceous, pale beneath when dry. *Scape* 6–10 inches high, very slender; bracts very unequal. *Calyx* $\frac{1}{3}$ inch long, obtusely angled. *Corolla* $\frac{1}{2}$–$\frac{3}{4}$ inch diam., claret-coloured. *Ovary* with a rounded 5-lobed crown. *Fruit* not seen.

PLATE VII. fig. 1, plant, *nat. size*; 2, calyx; 3, part of corolla laid open; 4, ovary: *all enlarged.*

13. P. DICKIEANA, *Watt*; glaberrima, efarinosa, foliis elliptico-obovatis v. oblanceolatis acutis integerrimis v. serratis sessilibus v. petiolatis, petiolo basi anguste membranaceo, scapo elongato 2–6-floro, floribus magnis sessilibus v. breviter pedicellatis, bracteis linearibus v. subulatis, corollæ flavæ tubo calyce duplo longiore intus hirsuto, limbo plano, disco pubescente. (TAB. VIII. A.)

SIKKIM HIMALAYA: Lachen, on open banks, alt. 10,000–13,000 ft., *J. D. Hooker.*

Rootstock stout, crowned with short sheaths that embrace the petioles. *Leaves* 1–3 inches, narrowed into broadly winged petioles, midrib stout, nerves indistinct. *Scape* stout, 3–10 inches; bracts membranous, sometimes inserted on the very short pedicel; flowers drooping. *Calyx* large, half as long as the corolla-tube and funnel-shaped throat. *Corolla* 1 inch diam., tube and throat hairy within, lobes rounded and bifid. Top of *ovary* obtuse, thickened. *Fruit* not seen.—A beautiful species, resembling small states of *P. Stuartii*; but the leaves are, when not entire, serrate, the corolla-disk is pubescent, and tube hairy within; it is scentless. It has not been found except by Sir J. Hooker in 1848.

PLATE VIII. A. fig. 1, plant, *nat. size.* 2, bract; 3, calyx; 4, portion of corolla laid open; 5, ovary: *all enlarged.*

14. P. SAPPHIRINA, *Hook. f. & Thomson, Herb. Ind. Or.*, Prim. no. 32; parvula, glabra v. puberula, foliis $\frac{1}{6}$–$\frac{1}{4}$ poll. longis obovato-spathulatis obtusis grosse v. subpinnatifide dentatis, scapo filiformi 1–4-floro, bracteis ovato-oblongis, floribus sessilibus nutantibus, calycis tubo brevi tereti lobis obtusis, corolla subcampanulata pruinosa, lobis brevibus bifidis. (TAB. XIII. C.)

SIKKIM HIMALAYA: Lachen valley, alt. 13,000 ft., *J. D. Hooker*.

Leaves forming small rosettes, $\frac{1}{4}$–$\frac{1}{2}$ inch diam., teeth large and deep, with scattered white hairs above; petiole very short. *Scape* 1–2 inches. *Corolla* $\frac{1}{4}$ inch diam., bright or pale blue, hoary. *Capsule* included.—A very elegant little species

PLATE XIII. C. fig. 1, plant, *nat. size*. 2, leaf; 3, bract; 4, calyx; 5, corolla laid open: *all enlarged.*

15. P. SOLDANELLOIDES, *Watt*; parvula, glaberrima, efarinosa, foliis $\frac{1}{4}$–$\frac{1}{2}$-pollicaribus ovatis grosse crenatis v. subpinnatifidis, scapo capillari 1-floro, flore magno nutante ebracteato, calycis lobis oblongo-ovatis obtusis, corolla alba late infundibulari, lobis brevibus grosse dentatis. (TAB. XI. C.)

SIKKIM HIMALAYA: Kankola pass, *J. D. Hooker*; Patang-la (*Herb. Hort. Calcutt.*).

Leaves $\frac{1}{4}$–$\frac{1}{2}$ inch long, base cuneate. *Scape* 1–2 inches, very slender, rigid; flower nodding. *Calyx* campanulate, cleft halfway. *Corolla* white, with hardly any tube proper, expanding from near the base into the dilated limb, $\frac{1}{2}$–$\frac{3}{4}$ inch long and broad. *Stamens* at the base of the corolla; filaments distinct. *Ovary* minute, globose, top hardened obtuse.—A very beautiful little plant, allied to *P. soldanelloides* and *P. sapphirina* and *tenella*. A group confined to Sikkim, as far as is known.

PLATE XI. C. fig. 1, plant, *nat. size*. 2, leaf; 3, calyx; 4, part of corolla laid open; 5, stamens: *all enlarged.*

16. P. WATTII, *King in Herb. Calcutt.*; foliis oblongo-oblanceolatis in petiolum angustatis obtusis grosse lobulato-crenatis v. dentatis, laxe molliter pilosis, crenis irregulariter dentatis v. integris, scapo elongato multifloro, floribus capitatis pendulis, bracteis membranaceis, calyce maximo cupulari laxo membranaceo irregulariter lobato et inciso-dentato, corolla violacea tubo calyci æquilongo, limbo late infundibulari 5-lobo lobis crenato-dentatis. (TAB. XIV. A.)

SIKKIM HIMALAYA: Chola Natong (*King*).

Rootstock small. *Leaves* few, 2–4 inches, membranous, $\frac{1}{2}$–$\frac{2}{3}$ inch diam., hairs flexuous; petiole rather slender, sometimes equalling the blade. *Scape* 5–6 inches; head of flower $1\frac{1}{2}$–2 inches diam.; bracts from narrow-lanceolate to almost rounded. *Calyx* $\frac{1}{3}$ inch diam., very loose, open, and thin, veined. *Corolla* glabrous within and without; tube $\frac{1}{4}$ inch; limb twice as long, and broad at the mouth. *Stamens* at the mouth of the tube; anthers oblong; filaments very short. *Ovary* globose, top rounded; style very short; stigma broadly capitate, truncate.—A very beautiful plant, closely allied to *P. uniflora* and *P. soldanelloides*, having the large membranous calyx of the former, which distinguishes these from all other species.

PLATE XIV. A. fig. 1, plant, *nat. size*. 2, bracts; 3, calyx; 4, portion of corolla laid open; 5, ovary: *all enlarged*.

17. P. STUARTII, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. p. 20.

Throughout the subalpine and alpine regions of the HIMALAYA and in TIBET bordering it, alt. 12,000–16,000 ft.; Afghanistan.

The following remarks upon this species are supplied by Sir J. D. Hooker:—

"This is one of the most common and puzzling of the Himalayan *Primulæ*, if, indeed, there be not two or more species included under it, with possibly hybrid intermediates. *P. denticulata*, which inhabits lower levels, and *P. petiolaris*, from still lower, are the only equally wide-spread common and protean Himalayan congeners. The original *P. Stuartii* was founded by Wallich on a yellow-flowered plant well figured in the 'Botanical Magazine' (tab. 4356); *P. purpurea*, published later by Royle (Ill. Pl. Himal. t. 77. f. 2), was founded on a purple-flowered one, which I find it impossible to distinguish by any other character from *P. Stuartii*, the two presenting a parallel series of varieties in the size, shape, mealiness, and crenature of the leaves, number of flowers and bracts, and the shape and comparative lengths of the calyx-lobes, and capsule. *P. Moorcroftiana*, of Wallich, founded on miserable fragments collected in Western Tibet by Moorcroft, is a third supposed species, which is obviously a small state of *purpurea*. The following is the best disposition of the series of forms that I can suggest. I suspect that all are forms of the beautiful *P. nivalis*, Pallas, of Siberia and Central Asia."

VAR. 1. *Stuartii typica*; foliis 5–10-pollicaribus anguste oblanceolatis spathulatisve acutis crebre argute denticulato-crenatis rarius integerrimis subtus flavo-farinosis, inflorescentia farinosa, calycis lobis linearibus lanceolatisve acutis v. obtusis, corollæ aureæ lobis orbicularibus et emarginatis v. obcordatis integris v. subdentatis.—P. Stuartii, *Wall. Cat.* 606 *in part*; *Tent. Fl. Nep.* t. 34; *Don, Prod. Fl. Nep.* 80; *Duby in DC. Prodr.* viii. 41; *Hook. Bot. Mag.* t. 4356.

VAR. 2. *purpurea*; foliis ut in var. 1, sed rarius dentatis v. crenatis sæpius latioribus, floribus interdum in verticillos superpositos dispositis, calycis lobis interdum fere pollicaribus lineari-oblongis obtusis, corolla pallide v. saturate purpurea, lobis obcordatis v. bifidis, capsula $\frac{1}{3}$–1-pollicari.—P. purpurea, *Royle, Ill. Pl. Himal.* 311, t. 77. f. 2: *Duby in DC. Prodr.* viii. 40; *Wall. Cat.* 606 (e Kumaon). P. macrophylla, *Don, Prod. Fl. Nep.* 80. P. Jaeschkiana, *Kerner in Bericht. des Naturwiss. medicin. Vereins Innspr.* Jahrg. i. Heft ii. 97. (TAB. IX.)

VAR. 3. *Moorcroftiana*. Minor, vix v. non farinosa, foliis oblanceolatis acutis sæpissime integerrimis, scapo breviore paucifloro, calycis lobis angustis acuminatis, corolla purpurea.—P. Moorcroftiana, *Wall. Cat.* 4988. Western Tibet. (TAB. X.)

VAR. 4. *macrocarpa*; foliis subtus farinosis 2–5-pollicaribus oblanceolatis obtusis acutisve, calyce majore $\frac{1}{2}$–$\frac{3}{4}$-pollicari fere 5-partito segmentis lineari-oblongis obtusis coriaceis, capsula pollicari.—Sikkim Himalaya, alt. 15,000–17,000 ft., *J. D. Hooker*.

VAR. 5. *lineariloba*; corollæ purpureæ lobis angustis divaricatis.—Tibet north of Sikkim, at a great elevation. Flowers alone of this were procured by Sir J. D. Hooker, who does not doubt their being referable to a very starved form of var. *purpurea*.

PLATE IX. *P. Stuartii* var. *purpurea*. Fig. 1, plant, *nat. size*. 2, calyx; 3, ovary; 4, calyx and capsule: *all enlarged*.

PLATE X. *P. purpurea* var. *Moorcroftiana*. Fig. 1, plant, *nat. size*. 2, calyx; 3, ovary; 4, calyx and capsule: *all enlarged*.

18. P. UNIFLORA, *Klatt in Linnæa*, xxxvii. p. 500; efarinosa, foliis parvis petiolatis orbicularibus v. late ovatis grosse v. subpinnatifide crenatis v. dentatis, scapo gracillimo 1–2-floro, bracteis

minutis, floribus magnis sessilibus nutantibus, calycis profunde 5-lobi segmentis quadratis, corolla late infundibulari, lobis brevibus latis grosse dentatis. (TAB. XI. B.)

SIKKIM HIMALAYA: on the Kankola Pass, alt. 15,000 ft., *J. D. Hooker.*

Rootstock small, with slender fibrous roots. *Leaves* ½–1 inch, including the petiole, rather slender, sparsely pubescent, base acute or truncate. *Scapes* one or more, tall for the size of the plant, 1–3 inches, slender; bracts oblong. *Calyx* nearly ¼ inch long, campanulate, membranous, segments almost truncate, apiculate, sometimes toothed. *Corolla* pale lilac; tube short, gradually expanding into a limb ¾–1 inch broad; lobes short, often 3-fid, the intermediate lobe very short. *Stamens* near the base of the corolla. *Ovary* globose.—A very remarkable species, unfortunately named, as it has usually two flowers, of which one is often imperfect; no other species has flowers so large in comparison with the foliage.

PLATE XI. B. fig. 1, plant, *nat. size*; 2, leaf; 3, scape and flower (one imperfect); 4, bract; 5, calyx; 6, ovary: *all but* 1 *and* 3 *enlarged.*

19. P. TENELLA, *King in Herb. Calcutt.*; glaberrima, efarinosa, foliis ½-pollicaribus obovatis v. trapezoideis supra medium grosse crenato-dentatis, scapo filiformi 1-floro, bractea minuta, calycis lobis obtusis, corollæ tubo gracili fauce late infundibulari, lobis latis profunde obcordatis. (TAB. XII. B.)

CHUMBI VALLEY, at Phari (between Sikkim and Bhotan), alt. about 15,000 ft.

Rootstock stout. *Leaves* mealy all over, especially beneath, subacute, petiole broadly winged. *Scape* very slender; bract close under the flower, shorter than the calyx. *Corolla* bluish white, tube ½ inch; limb ¾ inch diam. *Stamens* near the base of the tube. *Ovary* subacute, top thickened; stigma large, capitate.—A remarkable little species, very unlike any other.

PLATE XII. B. fig. 1, plant, *nat. size.* 2, bract and calyx; 3, portion of corolla laid open, with stamens and ovary: *all enlarged.*

20. P. ELWESIANA, *King in Herb. Calcutt.*; efarinosa, foliis 2–3-pollicaribus oblanceolatis subacutis integerrimis coriaceis,

nervis obscuris, scapo robusto elongato floreque magno solitario pubescenti-tomentoso, bractea 0, calyce brevi 5-partito segmentis ovato-lanceolatis, corollæ infundibularis $\frac{3}{4}$ poll. longæ lobis brevibus obovato-oblongis crenatis. (TAB. XII. A.)

SIKKIM HIMALAYA, alt. about 12,000 ft. (*King*).

Rootstock very stout, crowned with broad sheathing scales, which embrace the petioles. *Leaves* narrowed into broad winged puberulous petioles. *Scape* 6–7 inches; flower often 1 inch long and broad across the limb, pubescent all over. *Anthers* linear, near the mouth of the corolla. *Ovary* very small, conical, acute; style filiform, stigma minute, truncate.—A very remarkable and beautiful species, quite unlike any other.

PLATE XII. A. fig. 1, plant, *nat. size.* 2, calyx; 3, stamen; 4, ovary: *all enlarged.*

21. P. REPTANS, *Hook. f.*; minuta, dense cæspitosa, puberula, efarinosa, caule repente intricatim ramoso, foliis petiolatis cum petiolo $\frac{1}{6}$–$\frac{1}{4}$-pollicaribus orbicularibus convexis lobulatis v. grosse dentatis, scapo 0, floribus subsolitariis breviter pedicellatis erectis foliis multo majoribus, corollæ tubo calyce triplo longiore, fauce infundibulari, lobis profunde bifidis.—P. Stracheyi (partim), *Herb. Ind. Or., Hook. f. & Thoms.* (TAB. XIII. B.)

WESTERN HIMALAYA: Bargi-Kang Pass* north of Kumaon, alt. 14,500 ft., *Strachey & Winterbottom*; Kashmir, Bargila, alt. 14,500 ft., *C. B. Clarke.*

Stem very stout for the size of the plant, horizontal, rooting below and giving off above tufts of leaves and flowers. *Leaves* with the stout petiole about as long as the blade or longer, margins recurved, lobules or teeth acute or obtuse. *Bracts* at the base of the pedicel sessile amongst the leaves, rarely on a very short peduncle; pedicel shorter than the calyx. *Corolla-tube* nearly $\frac{1}{2}$ inch long, limb about as broad, pale purple. *Ovary* globose, top acute; stigma globose. *Fruit* not seen.—This interesting little species was partly confounded with *P. minutissima* in the distribution of Herb. Ind. Or., Hook. f. & Thoms.

PLATE XIII. B. fig. 1, plant, *nat. size.* 2, leaf; 3, bracts and calyces; 4, part of corolla laid open: *all enlarged.*

22. P. HOOKERI, *Watt*; pusilla, dense cæspitosa, efarinosa,

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* In the sheets of the 'Flora of British India,' which have now passed through the press, this locality was accidentally omitted.

foliis $\frac{1}{2}$–1-pollicaribus anguste obovato-oblongis v. spathulatis obtusis argute dentatis, dentibus recurvis, costa lata, scapo 0 v. brevissimo, floribus 1–3 breviter pedicellatis, calyce cupulari v. campanulato glanduloso, dentibus brevibus latis acutis, corollæ tubo late cylindraceo calyce duplo longiore, lobis rotundatis breviter bifidis. *Herb. Ind. Or.*, *Hook. f. & Thoms.*, Prim. no. 25. (Tab. VIII. B.)

Sikkim Himalaya: Lachen, alt. 12,000 ft., *J. D. Hooker.*

Roots of thick fleshy fibres. *Leaves* dark green, rather fleshy, rarely narrowed into a petiole, teeth often recurved, the outer reduced to oblong fleshy scales with toothed tips. *Corolla* white, tube about $\frac{1}{4}$ inch long, limb as broad. *Ovary* globose, top acute; stigma globose.

Plate VIII. B. fig. 1, plant, *nat. size.* 2, leaf; 3, bract; 4, calyx; 5, part of corolla laid open: *all enlarged.*

23. P. Muscoides, *Hook. f.*; minuta, dense cæspitosa, glaberrima, efarinosa, foliis $\frac{1}{16}$–$\frac{1}{10}$-pollicaribus sessilibus ovato-oblongis convexis apicibus grosse dentatis, costa crassa lata, scapo 0, floribus solitariis subsessilibus 2-bracteatis, corollæ tubo calyce brevi profunde 5fido duplo longiore cylindraceo, lobis brevibus. *Herb. Ind. Or.*, *Hook. f. & Thoms.*, Prim. no. 23. (Tab. IV. D.)

Sikkim Himalaya: Kankola Pass, alt. 15,000 ft., *J. D. Hooker.*

Much the smallest species of the genus, forming moss-like tufts amongst the roots of creeping alpine plants. It is closely allied to *P. Hookeri*; but the shape of the leaves is quite different, the flowers very much smaller.

Plate IV. D. fig. 1, plant, *nat. size.* 2, leaves; 3, bracts and flower; 4, calyx: *all enlarged.*

Var. ? *tenuiloba.* Leaves with short broad petioles; corolla larger, tube longer, slightly hairy, lobes longer, very narrow, cleft into two linear spreading lobes.—Sikkim Himalaya, at Yemutong, alt. 14,000 ft. (*Herb. Ind. Or.*, *Hook. f. & Thoms.*, Prim. no. 22). This may prove a different species, but is undoubtedly nearly allied to *P. muscoides.*

Plate XIII. A. fig. 1, plant, *nat. size.* 2, leaf; 3, bract and calyx; 4, portion of corolla laid open: *all enlarged.*

24. P. Stirtoniana, *Watt*; pusilla, dense cæspitosa, glanduloso-puberula, efarinosa, foliis $\frac{1}{2}$-pollicaribus obovato-spathulatis ob-

tusis planis argute dentatis, costa tenui, scapo 0, floribus solitariis, pedicellis brevibus gracilibus, corollæ tubo calyce duplo longiore superne infundibulari, lobis profunde bifidis integris v. crenulatis. (TAB. XIII. D.)

SIKKIM HIMALAYA: Kanglanamo Pass, alt. 14,000–16,000 ft., *G. Watt.*

Habit of *P. Hookeri*; but the leaves are flat and of a very different shape, the calyx has acute teeth, and the corolla-tube is not cylindric. *Bracts* 0, or very slender and placed on the pedicel. *Corolla* bright purple, $\frac{1}{2}$–$\frac{2}{3}$ inch diam., glabrous. *Ovary* obovoid, top thickened retuse, stigma capitate.

PLATE XIII. D. fig. 1, plant, *nat. size.* 2, scape, bracts, and calyx; 3, part of corolla laid open; 4, ovary: *all enlarged.*

2. ANDROSACE, *L.*

1. A. ROTUNDIFOLIA, *Hardwicke* (*non Wallich, Smith, et De Candolle*).—A. incisa, *Wall. Cat.* 616, *et in Roxb. Fl. Ind., ed. Wall. & Carey*, ii. 14, *excl. obs.*

"There has been much confusion regarding this plant, through Wallich and Sir James Smith having taken for it the little annual *A. saxifragæfolia*, Bunge, of the tropical plains of Bengal. This is the more extraordinary; for Hardwicke's description of his *rotundifolia* is not only accurate, but distinctive as regards the toothed involucral bracts; and he further states that it is a native of the highest mountains of Shreenugur, namely of the Kumaon Himalaya, where no one who had gathered *A. saxifragæfolia* in the tropical plains, as Wallich had, would expect that this last should be found."—*J. D. H.*

VAR. *macrocalyx*, Watt; laxe pubescens v. villosa, foliorum lobulis integerrimis v. crenatis, calycis lobis corollam longe superantibus ovatis v. obovatis argute dentatis.—Kumaon to Kashmir, alt. 5000–9500 ft.

VAR. *Stracheyi*, Watt; glanduloso-pubescens v. glabrata, scapis petiolisque gracilibus, foliorum lobulis integerrimis v. crenatis, bracteis elongatis dilatatis apicibus dentatis, calycis lobis corollam longe superantibus ovatis acutis integerrimis.—Garwhal, alt. 11,000 ft., *Strachey & Winterbottom*; Kunawur, alt. 8000–11,000 ft., *Munro &c.* (TAB. XV.)

VAR. *Thomsoni*, Watt; parvula, glanduloso-puberula, scapis petiolisque gracilibus, foliis parvis lobulis argute dentatis, floribus parvis, corolla calycem excedente.—Western Tibet: Dras river, *Thomson*; Iskardo and Barji-la, alt. 9000–10,000 ft., *C. B. Clarke*. This is a dry-country form. (PLATE XVII. B.)

PLATE XV. *A. rotundifolia* var. *Stracheyi*. Fig. 1, plant, *nat. size*. 2, corolla, 3, calyx and capsule: *both enlarged*.

PLATE XVII. B, *A. rotundifolia*, var. *Thomsoni*. Fig. 1, plant; 2, leaf, *both nat. size*. 3, bract; 4, calyx; 5, part of corolla laid open; 6, ovary; 7, calyx and capsule: *all enlarged*.

2. A. GERANIIFOLIA, *Watt*; perennis, stolonifera, laxe villosa, pilis patentibus, foliis rotundato-cordatis 7-lobis, lobis 3-lobulatis, petiolo elongato, bracteis setaceis integerrimis, corolla calycem parvulum excedente. (TAB. XVI.)

KUMAON, at Dwali, alt. 8200 ft., *Strachey & Winterbottom*; Sikkim, in damp woods, Lachen, alt. 9000–10,000 ft., *J. D. Hooker*.

A much larger and more flaccid plant than *A. rotundifolia*, differing also in having stolons; but possibly a woodland form of that species.

PLATE XVI. fig. 1, plant, *nat. size*. 2, bract; 3, flower; 4, ovary; 5, calyx and capsule: *all enlarged*.

3. A. CROFTII, *Watt*; pusilla, perennis, stolonifera, foliis reniformi-rotundatis grosse crenatis v. lobulatis lobulis 1–3-crenulatis, scapo paucifloro petiolis æquilongo, bracteis lanceolatis obtusiusculis, pedicellis brevibus calycibusque velutino-tomentosis, calycis lobis obtusis, corolla parva calycem non excedente, lobis obovatis retusis. (TAB. XIV. B.)

SIKKIM HIMALAYA: Singalelah, alt. 12,000–13,000 ft., *Watt*.

Whole plant when dry more or less rufous, with dense close-set bright red-brown spreading hairs on the petioles and scape. *Rootstock* short, creeping. *Leaves* 1 to 1½ inch long, blade ⅓–½ inch diam., hairy on both surfaces. *Flowers* ⅛ inch diam. *Corolla* apparently purple.—This belongs to the same section of the genus as *P. rotundifolia* and *geraniifolia*.

PLATE XIV. B. fig. 1, plant, *nat. size*. 2, calyx; 3, part of corolla laid open; 4, ovary: *all enlarged*.

4. A. CHAMÆJASME, *Host*.

VAR. *coronata*, Watt; dense cæspitosa, foliis arcte imbricatis lineari-oblongis obtusis villosis, scapo glanduloso, corollæ ore annulo prominulo cincto.—Western Tibet, alt. 16,000–17,000 ft., *H. Strachey, Henderson*. TAB. XVII. A.

PLATE XVII. A. fig. 1, plant, *nat. size*. 2, leaf; 3, bract; 4, calyx; 5, corolla; 6, ovary: *all enlarged*.

5. A. muscoidea, *Duby in DC. Prodr.* viii. p. 48; villosa, laxe cæspitosa, surculosa, foliis in globos interruptos dense imbricatis linearibus oblongisve obtusis incurvis, scapo brevi unifloro, calycis lobis subacutis, corollæ lobis obovatis apicibus rotundatis. (Tab. XVIII. B.)

Kashmir, *Jacquemont*, *Falconer*.

Forming loose patches 6–10 inches broad; branches and stolons 6–8 inches long, procumbent and ascending, clothed with subglobose tufts the size of a pea of imbricating leaves. *Flowers* numerous, $\frac{1}{10}$ inch diam.; pedicels $\frac{1}{16}$–$\frac{1}{10}$ inch.

Plate XVIII. B. fig. 1, plant, *nat. size.* 2, leaf; 3, calyx; 4, part of corolla laid open; 5, ovary; 6, calyx and capsule: *all enlarged.*

6. A. Selago, *Hook. f. & Thoms. in Herb.*; densissime cæspitosa, sericeo-villosa, ramis ramulisque condensatis apicibus obtusis, foliis minutis interruptis v. per totam longitudinem ramulorum dense imbricatis lineari-oblongis cuneato-obovatis obtusis supra medium coriaceis inferne membranaceis supremis incurvis, scapis 1–2-floris bracteisque villosis, calycis lobis oblongis obtusis, corollæ lobis obovato-oblongis. (Tab. XVIII. A.)

Sikkim Himalaya: in the Tibetan region and north of it, alt. 15,000–18,000 ft., *J. D. Hooker*.

A singular species, forming hemispherical hard cushions in the arid cold Tibetan regions. *Root* woody; tips of the branches silvery. *Leaves* $\frac{1}{14}$–$\frac{1}{12}$ inch. *Scape* slender, $\frac{1}{10}$ inch; bracts as long as the flowers. *Calyx* hemispheric, enclosing the capsule.

Plate XVIII. A. fig. 1, plant, *nat. size.* 2 & 3, leaves; 4, bract and calyx; 5, flower; 6, ovary: *all enlarged.*

Note on the Origin of *Cassia lignea*. By W. T. THISELTON DYER, M.A., F.R.S., Assistant Director Royal Gardens, Kew.

[Read November 16, 1882.]

THE Spice now known in pharmaceutical literature under the name of *Cassia lignea* has, from time immemorial, been an article of trade from South China. Flückiger and Hanbury are indeed of opinion that it was the Cinnamon of the ancients, what now bears the name being peculiar to Ceylon and unnoticed as a product of the island till the 13th century*. Cinnamon and Cassia are, however, enumerated amongst the products of the East from the earliest periods; and the former was known to the Arabians and Persians as *Darchini* (*dar*, wood or bark, and *chini*, Chinese). It seems in ancient times to have been carried by Chinese traders to the Malabar coast, where it passed into the commerce of the Red Sea. In this way the statements of Dioscorides, Ptolemy, and others are accounted for, who speak of Cinnamon as a product of Arabia and Eastern Africa, countries in which there is no reason to suppose it ever grew. At the present day it is still an important item in Chinese commerce. I find, from the Statistical Returns of the Chinese Imperial Customs (for copies of which Kew is indebted to Sir Robert Hart), that the export from China for the last two years stands as follows †:—

	Quantity.	Value.
1880......	38,784 piculs,	225,692 Haikwan taels.
1881......	57,456 „	300,303 „

1 picul=133⅓ lb.; 1 Haikwan tael=5*s.* 6½*d.*

With regard to the botanical source of *Cassia lignea*, it is remarkable, considering its ancient history and its present importance in trade, that up to the present time nothing certain has been ascertained. Flückiger and Hanbury remark:—"Although it is customary to refer it without hesitation to a tree named *Cinnamomum Cassia*, we find no warrant for such reference: no competent observer has visited and described the Cassia-yielding districts of China proper, and brought therefrom the specimens requisite for ascertaining the botanical origin of the bark" ‡.

Bentley and Trimen also remark, in their 'Medicinal Plants' §,

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* Pharmacographia, pp. 520, 521.

† Returns of Trade at the Treaty Ports for the year 1881, p. 10.

‡ Pharmacographia, p. 528.

§ Vol. iii. *sub tab.* 223.

"Though it is probable that this species (*Cinnamomum Cassia*) affords Chinese Cassia, the fact has never been proved."

In the face of the uncertainty felt by these authorities, it appeared to be desirable to have the point, if possible, cleared up. The attention of the Colonial Office was accordingly drawn to the matter, November 18, 1881; and it was suggested that Mr. Charles Ford, Superintendent of the Botanical and Afforestation Department, Hong Kong, might be allowed,,with the consent of his Government, to proceed to the Cassia-plantations on the West River for the purpose of reporting on the cultivation and collection of *Cassia lignea*, as well as of bringing back for distribution from the Hong-Kong Botanic Garden living and dried botanical specimens of the authentic plant. Lord Kimberley was so good as to approve of the proposal; and in the month of May last Mr. Ford accordingly started for the Cassia districts of the West River, the Sai Kong. He completely succeeded in the object of the expedition, and described his journey and its results in a Report to the Hong-Kong Government, August 9. This Report has been printed as a Government Notification (No. 339); but as in that form its circulation will necessarily be very limited, I think the facts deserve the wider circulation which will be afforded by the Society's Journal.

Mr. Ford's journey was timed so that he might be in the districts at the season when the trees were flowering. This enabled him to obtain authentic specimens for their botanical identification, and also to witness the operation of obtaining and preparing the bark.

Mr. Ford gives the following account of the geographical position and extent of the Cassia districts:—

"There are three chief districts where the Cassia is cultivated, viz.:—Taiwu, in lat. 23° 34′ N., and long. 110° 18′ E., in the Kwangsi province; Lukpo, in lat. 23° 6′ N., and long. 112° 24′ E.; and Loting, in lat. 22° 52′ N., and long. 111° 8′ E., both in the Kwangtung province. These are the market-towns of the district; but the Cassia is cultivated over a large area of country stretching to considerable distances from the towns, the extent of which could not be ascertained owing to the unreliable accounts given by the different people questioned, who either had very vague notions of area, or were disinclined, as they usually are, to give information to foreigners.

"Taiwu is about four or five miles from the West River, and is reached by a pleasant walk leading over a plain; but the nearest Cassia-plantations are situated twenty-five or thirty miles further in a southern or south-westerly direction, to which there is no communication by river. Taiwu is about 180 miles west of Canton. The Taiwu people said that the area of cultivation was not increasing *.

"The next most important, if not the *most* important (or at least tending in that direction) district is the Loting one, commencing at about eight or ten miles distant from the city of Loting. After leaving the West River about eighty miles of the Loting River—the Nam Kong—has to be traversed before reaching the city, and from there the distance to the plantations has to be accomplished overland. One of the largest cultivators said that in this district there were about 1,000,000 *maus* (about 52,600 English acres) under cultivation, and that the area was greatly extending every year. The cultivation of Cassia has been carried on here for only about twenty-five years, *i. e.* since the Tai-Ping rebellion, at which time, for the preservation of the plants and protection of them from destruction by the rebels, they were transferred from a district further south, at which it is reported the cultivation of Cassia was abandoned when it was commenced at Loting.

"The next district is that of Lukpo, which is much less important than the other two. The city of Lukpo is situated on the northern bank of the West River; and the plantations are situated at about 15 miles between the nearest one and the city.

"In addition to these places there are several small localities near the West River at intermediate places, where small patches of Cassia are grown; and as the quantities of bark obtained are too small to send to market towns, it is brought off by small boats and sold to larger boats which carry produce down the river.

"About six miles south-west of the small town of To Shing, which is situated on the southern bank of the river about 25 miles above the confluence of the Loting and West rivers, there are some plantations, from which, however, no bark has been obtained for two years and no new plantations made for ten, because the low prices which can now be obtained for the bark do not leave any profit to the producers. This was the only instance which came to my knowledge of the decrease of the trade in the Cassia-production, although it is said that the Java Cassia trade, in consequence of the lower prices at which the Cassia can there be produced, is cutting out and crippling the China trade."

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* "Near the town of Taiwu, according to Mr. Moss (Narrative of an Exploration of the West River, 1870), the best Cassia-bark is produced" (Bretschneider, 'Early European Researches into the Flora of China,' p. 13).

From each of the districts of Taiwu, Lukpo, and Loting, Mr. Ford obtained and sent to Kew copious and excellent specimens. These have been examined by my colleague Professor Oliver, who informs me that they certainly all belong to the same species, and that this is undoubtedly *Cinnamomum Cassia*, Blume. Mr. Ford took great pains to ascertain if this was the exclusive source of *Cassia lignea*. He reports :—

"This is the *only* tree from which Cassia-bark, 'buds,' or leaves of commerce in China, so far as could be ascertained from personal inspection and reports, are obtained. All the trees seen in the districts of Taiwu, Loting, and Lukpo, and intermediate localities where Cassia was grown in smaller quantities, were of this species, nor were there, apparently, distinct varieties of the species in cultivation. The cultivators and other natives were much interrogated as to whether they knew or had heard of any other tree which yielded the products under notice, and the invariable reply was that there was no other kind. There is therefore, I think, no doubt but writers who have named other kinds as Cassia-yielding trees of China have been mistaken or misinformed on the subject. One writer alludes to a tree in terms which partly correspond to the description of *Machilus velutina*, Champ., another tree belonging to Lauraceæ, and indigenous to South China. It is quite possible that this tree may have been supposed by a casual observer to yield cassia-bark, because it is sometimes grown in plantations intermixed with those of *Cinnamomum Cassia*. The trees are reared, planted, and treated in precisely the same manner as the Cassia trees ; but the bark is required for a very different use, viz. to supply a glutinous extract which is used to stick together powdered Cassia-bark and sandal-wood (*Santalum album*) to form the joss-sticks used for incense. *Cinnamomum Burmanni*, Bl., which it has been supposed may probably yield 'in part the Cassia-bark of the Canton market,' does not, I feel sure, supply Cassia-bark to any extent. I did not see it anywhere cultivated ; nor was it seen growing wild in any but very small quantities, and these wild trees bore no signs of having been cut as had the Cassia trees: many natives were asked if it was ever used; but, with one exception, all denied that it afforded any Cassia-bark. The one exception was an old woman, who was cultivating a field of Indian corn close to a few small trees of *Cinnamomum Burmanni*, and who said that its bark was sometimes, but rarely, used to adulterate the true Cassia-bark."

Mr. Ford on his return journey paid a visit to the well-known Chinese botanist, Dr. Hance, H.M. Vice-Consul at Whampoa, who identified the specimens of the Cassia lignea tree collected by Mr. Ford as belonging to *Cinnamomum Cassia*. There is, in fact, in the Kew Herbarium a specimen of the same species collected by Dr. Hance in 1876; but I have searched in vain to see if Dr. Hance has published any thing about it, and the specimen bears no note that it is the source of Cassia lignea. This specimen is the material upon which the plate given by Bentley and Trimen is based, and represents no doubt the true plant.

Cinnamomum Cassia was first described by Blume in 1825 *. The species was apparently founded on cultivated specimens from Java, where Blume states it was "ex China introductum."

The Kew Herbarium possesses a cultivated Java specimen contributed by the Leyden Herbarium. This is no doubt an authentic type of the plant described by Blume; and Professor Oliver finds that it agrees precisely with the plant collected by Mr. Ford on the West River. It may be therefore considered finally settled, on the one hand, that the Chinese Cassia lignea plant is really the *Cinnamomum Cassia*, Blume, and, on the other hand, that the plant cultivated in Java is identical with that now known to be the source of the spice in China.

It is remarkable that though the cultivation of the Cassia lignea tree has apparently been carried on in Southern China from time immemorial, it does not appear to be indigenous there †. In Cochin-China, however, there appears to be some probability of its being really wild. *Cinnamomum Cassia* is, botanically, very closely allied to *C. obtusifolium*, Nees, one of the species from which a similar product is obtained on the Khasia hills.

It only remains to give Mr. Ford's account of the mode of collecting and preparing the bark. He obtained and sent to this country a set of the implements, which are deposited in the Kew Museum.

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* 'Bijdragen Fl. Nederl. Indië,' ii. p. 570.

† The earliest printed notice in works professing to give botanical information about China appears to be in Martini's 'Atlas Sinensis' (1655). See Bretschneider's 'Early European Researches into the Flora of China,' p. 13.

" *Bark.*—When the trees are about six years old, the first cut of bark is obtained. The season for barking commences in March and continues until the end of May, after which the natives say the bark loses its aroma, and is therefore not removed from the trees. The branches, which are about an inch thick, being cut to within a few inches of the ground, are carried to houses or sheds in the vicinity of the plantations. All the small twigs and leaves being cleared off, a large-bladed knife, with the cutting-edge something like the end of a budding knife, is used to make two longitudinal slits and three or four incisions, at sixteen inches apart, round the circumference through the bark; the bark is then loosened by passing underneath it a kind of slightly curved horn knife with the two edges slightly sharpened. Pieces of bark sixteen inches long and half the circumference are thus obtained.

"The bark, after its removal and while it is still moist with sap, is then laid with the concave side downwards, and a small plane passed over it, and the epidermis removed. After this operation the bark is left to dry for about twenty-four hours, and then tied up in bundles about eighteen inches in diameter, and sent into the merchants' houses in the market-towns.

" *Leaves.*—The leaves which are cleared from the branches that are barked are carefully preserved and dried, and afford by distillation Cassia oil. A large quantity of leaves are sent to Canton, where I was told the operation of distilling is performed.

" *Twigs.*—These are removed from the cut branches at the same time as when the leaves are obtained. They are a marketable commodity for native uses.

" *Buds.*—Cassia-buds are the immature fruits. They are gathered when about one-eighth grown. Buds, and the seeds which are annually required for sowing, are obtained from trees ten years and upwards of age that are left standing at about fifty and a hundred feet apart amongst the trees which are cut down every six years for their bark. These seed-bearing trees are not cut, unless there is a demand for the very thick bark on their trunks, when some of the trees which can be conveniently spared are sacrificed."

On the Passifloreæ collected by M. Edouard André in Ecuador and New Granada. By MAXWELL T. MASTERS, M.D., F.R.S., F.L.S.

[Read November 16, 1882.]

(PLATES XIX. & XX.)

THE following notes comprise a descriptive list of the Passifloreæ gathered by M. André in his remarkable journey in Ecuador and New Granada, in 1875 and 1876, and specimens of which have been kindly placed in my hands for determination. Owing to the intrinsic complexity of floral organization, and more especially to the defective nature of herbarium specimens, any fresh accession of well dried examples of this group is more than usually welcome. M. André's specimens are generally excellent; they are accompanied by descriptive notes taken on the spot, and often by careful analytical drawings.

By the aid of these notes I have been enabled to determine almost all the plants collected by M. André, to indicate certain species as new, as well as to supplement and correct, in some cases, what I have previously written concerning the plants of this order.

In enumerating the species I have followed the order adopted in my monograph of the Order in Martius and Eichler's 'Flora Brasiliensis,' vol. xiii. pars 1, published in March 1872, and which I have cited throughout. I have also availed myself of the monograph of New-Granadan species published by MM. Triana and Planchon in the 'Annales des Sciences Naturelles,' 5^{me} sér. tome xvii. (1873), pp. 121 *et seq.* Although issued subsequently to the part of the 'Flora Brasiliensis,' it is most probable that the monograph of MM. Triana and Planchon was completed some time before; for they refer constantly to my "Contributions to the Natural History of the Passifloraceæ," published in the Transactions of this Society, vol. xxvii. p. 593 (1871). In that paper the species were only indicated by name, without descriptions or illustrations. It hence became incumbent on me in a few instances to furnish further explanations; and this I have already done (in the case of species cultivated in Europe) in the 'Journal of the Royal Horticultural Society,' 1872, vol. iv. pp. 125 *et seq.*, and also, where occasion demanded it, in the present memoir under the head of particular species.

For the most part I have cited the notes as to conformation and locality furnished by M. André in his own words; but, although I have freely utilized M. André's observations, I trust I have done so in such a way as to exempt him from any shortcomings on my own part.

TACSONIA, *Juss.*

1. T. PINNATISTIPULA, *Juss.*, *Mast. l. c.* p. 537.—Passiflora pinnatistipula, *Cav.*, *Triana & Planchon, l. c.* 140.

"Sabana de Bogotá prope Fontibón, Nov. Granata, alt. 2576 met. Flores rosei, coronæ radii cœrulescent., fructus subsphæric. maturit. flavesc. edulis. Nom. vernac. 'Chulupita.' *Ed. André* 1282."

This is a southern species, occurring in Bolivia (*Weddell*!) and Chile (*Miers*!). Near Bogotá it is cultivated for its edible fruit.

2. T. FLEXIPES, *Mast.*—Passiflora (§ Poggendorffia) flexipes, *Triana & Planchon, l. c.* 142.

Forma foliis integris ovato-lanceolatis vel trilobatis, heterophyllis.

"Mediacion in decliv. orient. montis Quindio, Nov. Granat., alt. 2300 met.: heterophylla; flores pallide rosei. *Ed. André* n. 2053."

3. T. JAMESONI, *Mast. in Flor. Brasil. l. c.* 537.

"In decliv. occident. montis ignivom. Pichincha, Ecuador, altit. ad 3700 met.: flores pulchre rosei, colore extus intensiore. *Ed. André* sine numero."

4. T. MANDONI, *Mast. in Flor. Brasil. l. c.* 538.

"Quebrada Comocruz in decliv. occid. montis Corazon, Ecuador, alt. 2400 met.—Fol. reticulatis supra corrugatis plus minus tomentos.; cirris et petiolis (20 cm. long.) violaceis; bracteis læte viridibus; floris tubo cylindrato sulcato pallide lutescente, lobis externis extus salmoneis intus lilacinis, internis pulchre roseo-violaceis; ovario pubescente, stigmatibus hemisphæricis; antheris oblongis. *Ed. André* n. 3654."

5. T. (§ RATHEA) FLORIBUNDA, *Mast. l. c.*—Rathea floribunda, *Karst. Flor. Columb. Ic. Select.* t. 38.

Var. MAJOR, *Mast. et André*, omnia ut in typo, sed flores fere duplo majores. Vide tab. XIX.

"In decliv. occid. montis ignivom. Corazon, Andium Quitensium, Ecuador, circa 2500 met. *Ed. André* n. 3679."

This is a very remarkable species, having orange-coloured and yellow, tubular funnel-shaped flowers, the petals arising, not from the top of the flower-tube as usual, but from near the centre as in some species of *Modecca* or of *Wormskioldia.*

The present plant does not appear to differ from that described and figured by Karsten, except in the much larger flowers. Until further researches prove whether or not there are more forms with the same peculiarity, it seems better to consider M. André's plant as a variety rather than as a separate species.

Except in the peculiar origin of the petals, the plants do not differ in any way from *Tacsonia*; and hence it seems preferable for the present to keep Karsten's name as the indication of a section only and not as that of a separate genus. *T. floribunda* and its variety differ from the *T. bracteosa*, Planch. & Lind. *l. c.* p. 137, in the fact of the petals originating from the centre of the tube, not from the upper part. The last-named plant is made the type of a distinct section (§ *Tacsoniopsis*), and distinguished by the limb of the calyx (" saltem quod sic perperam dicitur ") being 5-fid, not 5-partite, and by the petals being exserted, " bien au-dessus de la gorge du calyce, c'est-à-dire sur la portion dilatée du limbe, laquelle est simplement 5-fide, au lieu d'être 5-partite." The " insertion," or, more strictly speaking, the " exsertion," of the petals in these plants, then, takes place (1) at the throat of the flower-tube, the most usual place; (2) above it, as in *T. bracteosa*; (3) below it, as in *T. floribunda.*

Owing to the scarcity or imperfect condition of the flowers of some species in herbaria, it is not possible to subject them to complete examination; but when better material becomes accessible, it is probable that other species will be found to possess the same peculiarity as *T. floribunda.*

As M. André's specimens of the last-named plant are exceptionally good, I append a full description as follows:—

Scandens, cirratus, glaber. Rami angulati. Folia 8–9 cm. long., 10 cm. lat. Petiolus 1–3 cm., gracilis, glandulis 2–3 sessilibus onustus. Stipulæ lineari-lanceolatæ acuminatæ glanduloso-serratæ. Laminæ foliorum suborbiculares, basi rotundatæ, fere ad basin 3–5-sectæ, segmentis lanceolatis apiculatis serrulatis, medio paulo longiore et ad basin angustato; nervi subtus prominentes, nervi secundarii remotiusculi. Pedunculi teretes, 1-flori, 8–10 cm. longi. Bracteæ 4 cm. long., 2 cm. lat., foliaceæ, oblongo-lanceolatæ, serrulatæ, acutæ. Flores ad 12–13 cm. longi [basi aurantiaci, apice lutei,

intus pallidiores, *E. A.*]. Floris tubus glaber, cylindrato-infundibuliformis. Sepala 5, late oblonga, obtusa, tubo triplo breviora. Petala 5 oblonga, e medio floris tubi enascentia, e fauce breviter protrudentia, lobis calycinis parum breviora. Corona faucialis abest. Corona basilaris membranacea, parva, deflexa, basin gynandrophori cingens. Gynandrophorum elongatum, gracile, sulcato-angulatum, floris tubum æquans, demum exsertum. Filamenta linearia, e gynandrophoro versus apicem emergentia. Antheræ oblongæ obtusæ. Ovarium supra filamentorum exsertionem longe stipitatum, ellipticum, pubescens, stylis 3 clavato-filiformibus superatum. Stigmata 3, majuscula reniformi-capitata.

6. T. MANICATA, *Juss.*, *Mast. in Flor. Brasil. l. c.* 539.—Passiflora manicata, *Persoon, H. B. K., ex Triana & Planchon, l. c.* 139.—T. ignea, *hort.*

"Machin in monte Quindio, Nov. Granat., alt. circ. 2500 met., *Ed. André* n. 2114; Quindio in temperatis, *Ed. André* n. 1241 *bis*; prope Pasto in Nov. Granat. meridionali alt. 2700 met., in sepibus frequens—flores vividè-scarlatini, corona cœrulea, *Ed. André* sine numero; San José ad ped. montis Chimborazo, Ecuador, Aya purupuru incolarum, *Ed. André* sine numero; Ibarra, Ecuador—flores pulchre coccinei, corona cœrulea, frutex dumosus sarmentosus, *Ed. André* absque numero."

This species is one of those that extends southwards into Chile, having a wider range of distribution than most of its allies.

7. T. MIXTA, *Juss.*, *Mast. in Flor. Brasil. l. c.* 542, *et in Journ. Roy. Hort. Soc.* (1872) vol. iv. p. 126.

Subspec. NORMALIS, *Mast. l. c.*; caule subangulato, foliis, involucro urceolato vel serius campanulato (extus) florisque tubo fere omnino glabris.

P. Tacso, Cav., *P. longiflora*, Lam., ex spec. authent. Juss. in Mus. Paris. asservatis!

"In decliv. occid. mont. ignivom. Corazon, Ecuador, alt. 2500–2000 met.: flor. pallide rosei; corona rudimentaria cœrulescens. *Ed. André* sine numero. Prope Ipiales (Cauca), Nov. Granat., alt. 3100 met. *Ed. André* sine numero."

Var. QUITENSIS, *Mast. l. c.*—T. quitensis, *Benth.*—P. tomentosa, *Triana & Planchon, l. c.*, an vere Lam.?

Caule subangulato; petiolis, involucro urceolato (extus) florisque tubo puberulis; foliis superne glabris, deorsum densiuscule pubescentibus.

"La Ceja in decliv. orient. montis Quindio, Nov. Granat., alt.

3200 met.: flor. intus pallide rosei, extus virides. *Ed. André* n. 2187."

Var. BICORONATA.—Tacsonia bicoronata, *Mast. in Fl. Brasil. l. c.* 541.

"Tuza, Ecuador, alt. circ. 2800 met.: flor. pallide rosei; fructus oblongus edulis magnitudine ovi anserini. *Ed. André* sine numero.—Folia læte viridia nitida; bracteæ virides nervis pallidioribus; floris tubus viridescens, lobi exterior. extus viridescent. intus rosei, lobi interior. pulchre rosei; annulus centralis coccineus; corona intense violacea radiis apice albis obtusis; stamina aurata; stigma superne viride. *Ed. André.* Curubita del Indio."

Owing to the presence of a double faucial corona in this plant, I separated it as a distinct species from *T. mixta*; but MM. Triana and Planchon are probably correct in referring it to *T. mixta*, of which, however, it may form a variety.

In the 'Flora Brasiliensis' and elsewhere I have included *T. speciosa*, H. B. K., under *T. mixta* as a variety; and Triana and Planchon also rank Humboldt & Bonpland's *speciosa* as synonymous with *T. mixta*; but the terete stems and less-divided leaves are reasons why it might preferably be ranked with *T. mollissima*, or in close alliance to it.

8. T. HEDERACEA, *Mast. & André*, sp. n.: caule angulato; foliis coriaceis glaberrimis orbiculato-3-lobis recurvo-serratis; involucro cylindrato tubulato extus glabro, intus tomentoso; floris tubo glabro, sepalis oblongis apiculatis; petalis obovato-oblongis; corona fauciali e processibus obtusis dentiformibus constante; ovario elliptico pubescente.

Folia 3½ cm. long., 4 cm. lat.; lobi late ovati, medio longiore. Petioli 1½ cm., glandulis parvis 1–3 circa apicem. Pedunculi quam petioli duplo longiores. Involucrum 3½ cm. Floris tubus 10 cm., limbus diametro 8 cm. Fructus immaturus 5–6 cm. long., glabrescens, ellipticus.

"In decliv. occid. Andium æquatoriensium prope Juantu.—Flores obscure cœruleo-violasc., stylus violac., stigma virid., anther. luteæ; coronæ glandulæ albæ, basi nigrescentes. Forma foliorum, habitu, floris coronæque colore distinctissima." *Ed. André* n. 4012. Paramo O. de Guaranda, in decliv. occident. montis Chimborazo, Ecuador, alt. 2800 met.: flores violacei, n. 4012, spec. fructif."—In silvis prope Pasto, *Jameson* n. 420! in herb. Mus. Brit.

9. T. MOLLISSIMA, *H. B. K.*, *Mast. in Flor. Brasil. l. c.* 541, *et in Journ. R. Hort. Soc. Lond.* vol. iv. (1872), p. 125.—T. tomentosa, var. β. mollissima, *Triana & Planchon, l. c.* 131.

T. caule tereti tomentoso; foliis tripartitis v. trisectis utrinque pubescentibus vel superne glabrescentibus; involucro brevi puberulo, sæpius inæqualiter trifido vel trisecto, segmentis nonnunquam margine eversis; floris tubo sæpius glabro, raro puberulo.

"Fontibon prope Bogota, Nov. Granat., alt. 2576 met.—Flos rubro-scarlat., fructus ovoideus edulis. Vernacule "Chulupa." *Ed. André* n. 1287."

MM. Triana and Planchon refer this to *P. tomentosa* of Lamarck, the *T. tomentosa* of Jussieu, which they further cite as synonymous with the *P. tomentosa* of Cavanilles, the latter being rather referable to *P. mixta.* The true *T. tomentosa* of Jussieu is a native of Peru, and, like *T. mollissima*, has terete stems; but the leaves are more nearly orbicular in outline, and less deeply divided, the central lobe not being greatly, if at all, longer than the lateral ones; moreover the flower-tube is downy. For the present, then, it seems preferable to retain the Peruvian *T. tomentosa* as distinct from the more northern *T. mollissima. T. speciosa*, H. B. K., although previously referred by me to *T. mixta* as a variety, and considered synonymous with that species by Triana and Planchon, is probably better referred to *T. mollissima*, of which it has the terete stems and the relatively more divided leaves. The species are, however, so variable and so difficult to define in the herbarium, that there are abundant grounds for differences of opinion. In all probability the species intercross freely in their native country.

PASSIFLORA.

1. P. ARBOREA, *Spreng.*, *Masters in Fl. Bras. l. c.*, *in Gard. Chron.* 1867, p. 1070, *et in Journ. Roy. Hort. Soc.* 1872, vol. iv. p. 128.—P. glauca, *Humb. et Bonpl.*!; *Triana & Planchon, l. c.* p. 181, *nec Solander in Aiton.*

"Quebrada de Armada, alt. 994 met. et inter Altaquer et Paramo, alt. 1050 met., in Andibus meridion. Nov. Granat. *Ed. André* 3352."

This is no doubt the plant called by Humboldt and Bonpland *P. glauca*; but Aiton's, or rather Solander's *P. glauca* dates from 1789. Of this latter the type specimen exists in the Banksian herbarium. It corresponds with Jacquin's figure, and has nothing

to do with Humboldt's plant. Nor is it the same as A. P. De Candolle, Triana, Planchon, and others have assumed as the *P. stipulata* of Aublet. Specimens from v. Rohr in the Britis Museum correspond exactly with Aublet's figure, as also, but less closely, does a specimen of Dr. Hancock's from Demerara and contained in the Kew herbarium.

2. P. MACROPHYLLA, sp. n. (§ Astrophea), *Mast. ex Spruce in herb.*—P. arborea, *Spreng., Mast. l. c. pro parte.*

Arborea ecirrosa; foliis amplissimis usque ad 75 cm. longis et ultra, glaberrimis, cordato-subpeltatis, versus basin eglandulosis vel glandulis paucis præditis, ovato-lanceolatis acuminatis, petiolo crasso 3½ cm.; cymis pedunculatis dichotomis, pedunculis petiolo multo longioribus; floribus diametro 6–7½ cm., tubo elongato (12 mm. et ultra) cylindrato glabro basi haud intruso; sepalis oblongis obtusis subcoriaceis tubo duplo longioribus; petalis conformibus tenuioribus brevioribus albidis; coronæ faucialis biserialis filis extimis liguliformibus tenuibus quam petala parum brevioribus, filis intimis brevissimis carnosulis oblongis sursum flexis; corona media e tubo versus basin emergente tubulato-membranacea, apice in filas breves erectas divisa; urceolo tubi infra coronam membranaceam crasso albido.

In Peruvia? *Spruce* n. 6144!; Rio San Antonio in viciniis montis Chimborazo, Ecuador, *Spruce* n. 6203!—"Peripa secus Rio Daule, Ecuador: arbor 3–4 met. alt. ramis depauperatis, flor. extus albis intus flavis (fl. Julio). *Ed. André* n. 4227."

In the 'Flora Brasiliensis' I have treated this as a form of *P. arborea.* M. André's specimens, however, having afforded ample means of examining the flowers, I am disposed to consider the present, as Spruce also did, a distinct species, and to adopt the characteristic name indicated by that traveller.

In addition to the relatively gigantic leaves, the present species differs from its allies in its longer peduncles, larger flowers, the tube of which is nearly cylindrical, in the long, flat, thin faucial coronal threads (not thickened and hatchet-shaped as in *P. arborea*), in the longer membranous corona, the thickened urceolus, and the slender gynophore.

3. P. SPHÆROCARPA, *Triana & Planchon, l. c.* 184.

Var. PILOSULA; novellis foliisque subtus puberulis.

"Prope Piedras, Nov. Granat., alt. 378 met.: frutex 2–4 met. secus ripas tributariorum fluminis Magdalenæ, præsertim amnis

dicti Rio Chipalo obvius. Flores candidi iis *Citri Aurantii* subsimiles. *Ed. André* n. 1945. Guataquicito, ad rip. sinist. flum. Magdalenæ Nov. Granat., alt. 360 met.—Arbuscula 4–5 met. alt., rami ascendentes in capite frondoso congesti; flor. candidi, staminib. luteis, stigmat. viridib.; fruct. oblong. minor edulis. Vernacule "Gulupo." *Ed. André* 1945."

In the subgenus *Astrophea*, Messrs. Triana and Planchon include *P. Lindeniana*, Planch. MSS., *P. ocanensis*, Planch. & Lind., *P. sphærocarpa*, Triana & Planch., and *P. pubera*, Planch. & Lind., specimens of the two first of which I had referred to *P. emarginata*, Humb. & Bonpland, and examples of the two latter to *P. ovata*, Martin. Without fuller examination than I am at present able to make, I can offer no opinion as to the validity of these species. The type of *P. ovata*, Martin, is in the British Museum; but it is not in a state to permit of examining the flower except superficially. In any case it differs greatly from the plant described by Triana and Planchon, *l. c.* p. 184 *adnot.*, from a specimen of Melinon n. 210 in the Paris herbarium, but which I have not seen. From the description, however, I take this to be the same species as was gathered on the Corembyne river by Mr. Im Thurn, and of which I append a description*.

As to M. André's specimens above referred to, I cannot identify them with certainty with either of the forms described by MM. Triana and Planchon. M. André, indeed, who has compared them with authentic specimens in the Paris herbarium, refers them to *P. sphærocarpa*; but that is described (*l. c.*) as being "glaberrima," and as having leaves glaucous beneath. Moreover, the fruit is described, probably by inadvertence, as "capsula." M. André's plants are, in some respects, like the specimens referred to *P. pubera*; but they have smaller, much less pubescent leaves, representing, perhaps, the form spoken of (p. 185) as having "feuilles moins pubescentes ou presque glabres en *dessous*." M. André's plants, however, are nearly glabrous *above* and pilosiusculous below, but not at all glaucous.

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* P. EMINULA, *Mast.*, sp. n. (§ *Granadilla*); foliis breve petiolatis, petiolis striatis apice biglandulosis, laminis puberulis obovato-oblongis cordatis acutis; floris (8–9 cm. diam.) tubo (1 cm.) glabro campanulato; sepalis coriaceis oblongo-obtusis; petalis subconformibus minoribus albidis; coronâ fauciali filamentosa pluriseriata, filis extimis petalis subæquilongis, basi a latere complanatis, superne 2–3-lob., lobis obtusis crassis crispatis, lobo terminali longe producto filiformi tuberculis minimis dense obsito; filis interioribus simplicibus sensim minoribus; corona media membranacea e medio tubi deflexa; corona inframediana carnosula; gynandrophoro angulato, supra basin dilatato; ovario cuboideo, sulcato, pubescente.—Ad flumen Corembyne, *Im Thurn in herb. Kew.* Vide tab. XX.

The following description applies to M. André's plant, which I here consider a pilosulous form of *P. sphærocarpa*:—"Arborea vel fruticosa, novellis, foliorum pagina inferiore, sepalis (extus) ovarioque puberulis. Petioli 1 cm. Folia subcoriacea, oblonga, obtusa, emarginata, basi rotundata ibique glandula ocellata utroque latere prædita. Inflorescentia paniculatim cymosa foliorum, casu aphylla, erecta. Pedunculi breves. Alabastra claviformia. Flores expansi 4 cm. diam. Tubus campanulatus pilosulus. Sepala oblonga obtusa ecorniculata, intus albida. Petala albida conformia, tenuiora, paulo breviora. Corona extima faucialis e filis arcuatis superne clavato-dilatatis vel dolabriformibus constans, fila interiora multo breviora erecta apice vix dilatata; corona media membranacea e tubo versus medium assurgens, basi tubulata, integra vel 2–3-partita, superne denticulata denticulis aliis erectis aliis inflexis. Ovarium cuboideum, sulcatum; styli puberuli.

As specimens of the true *P. ovata* of Martin do not, so far as I am aware, exist in any other herbarium but that of the British Museum, it may be well to give here some of its characteristics, complete description being impossible owing to the condition of the specimens.

P. ovata, Martin. Arbor? vel arbuscula? ecirrosa? vel cirris paucis prædita. Rami subangulati, tomento rufo vestiti. Folia circa 10 cm. longa, 5 cm. lata, coriacea, glabra, oblonga, obtusa. Petioli graciles, 3 cm., apice glandulis sessilibus præditi. Stipulæ. . . . Cirri quandoque deficientes? simplices. Pedunculi supraaxillares, petiolos subæquantes, superne bifurcati. Bracteæ . . . . Flos 3 cm. diam. campanulatus; tubus brevis, glaber. Sepala glabra, oblonga, obtusa, ecorniculata. Petala conformia, sepalis breviora. Corona faucialis filamentosa, filis externis liguliformibus superne dilatatis quam petala parum brevioribus, filis interioribus brevioribus, corona membranacea e tubo versus medium assurgens . . . . Gynandrophorum glabrum. Ovarium cuboideum, sulcatum, puberulum, stylis 3 subulatis ad angulos superatum; stigmata (pro genere) parva . . . . Cæt. desunt.

It is clear from this that the plant has nothing to do with that mentioned by MM. Triana and Planchon. From its general appearance, and from what can be distinguished as to the corona, and especially from the form of the ovary and styles, I believe *P. ovata* to belong to the section *Astrophea*, even if, as is probably the case, I have been in error in assigning some of the specimens mentioned by MM. Triana and Planchon to this species on insufficient evidence.

4. P. CORIACEA, *Juss., Mast. in Flor. Brasil. l. c.* 578; *Triana & Planch. l. c.* p. 158.

"Inter Tulua et Buga, n. 2447, et inter Yotoco et Vijes (Cauca), Nov. Granat., 2247; alt. 1025, Mart. 1876. Vulgo 'dejarretadura;' las Juntas (rio Dagua), Nov. Granat., alt. 300 met.; Ibague ad ped. mont. ignivomi Tolima, Central And. Nov. Granat., n. 2004; prope Pandi alt. 1200 met., n. 1444. *Ed. André.*"

The leaves of the living plant are described by M. André as dark green, the sepals greenish externally, paler within, the outermost coronal threads blackish violet at the base, white at the tips, the succeeding threads blackish violet capitate, rose-coloured at the ends, the innermost corona glandular, blackish violet, the stamens, ovary, and stigmas green.

5. P. SUBEROSA, *Linn., Mast. in Flor. Brasil. l. c.* 577; *Triana & Planchon, l. c.* p. 157.

"Prope Vijes (Cauca), Nov. Granata, alt. 1050 met.; in rupibus arenosis aridis. *Ed. André* n. 2704."

M. André's specimens have no flowers, and represent a form of this eminently variable species with ovate 3-lobed leaves, somewhat coriaceous and more or less downy on both surfaces.

6. P. FŒTIDA, *Linn., Mast. in Flor. Brasil. l. c.* 582; *Triana & Planchon, l. c.* p. 170, *pro parte.*

(1) "Portachuelo (Cauca), Nov. Granata, alt. 1000 met.; in rupib. arenos. aridissim.; flor. albidi. *Ed. André* n. 1626." A form with hirsute pubescence, without subjacent tomentum; some of the marginal hairs gland-tipped; fruit yellowish, with a few scattered setæ.—(2) "Chinaota prope Fusagasuga, Nov. Granat., alt. 1100 met. In sepibus regionis aridæ arenosæ. *Ed. André* n. 1626 (*bis*)."—"Rio Dagua, prope La Laguna, Nov. Granat., alt. 997. *Ed. André* n. 1626 (*ter*)." Of the glands on this specimen, M. André makes the observation "adsunt glandulæ pedicellatæ brunneæ quarum pediculus vasis spiralibus præditus est glandularum *Droseræ* instar." There are no flowers or fruit. These last represent a form with denser and more copious pubescence than the foregoing, the coarser hairs springing from a felted mass of

short soft pubescence. They may be referred to the form "gossypiifolia." The same remarks apply to another specimen under the same number gathered near Viota, New Granada—(3) "Peripa, Ecuador, alt. 200 met., *E. André* n. 4412." A form with nearly glabrous striate stems, relatively large 3-lobed leaves, the central lobe ovate-acuminate, much larger than the lateral ones, all thinly covered with rather short appressed pubescence; no flowers or fruit; n. 4710, "in Peruvia, prope Payta" represents apparently the same form.—(4) "Daule, Ecuador, *Ed. André* n. 4142 (*bis*)." A form very similar to the preceding, but with the stems covered with long spreading hairs; fruit yellowish olive, with a few coarse spreading hairs.—(5) "Las Juntas, Rio Dagua, Nov. Granata, alt. 300 met. *Ed. André*." Similar to the preceding, but rather less hairy, the fruits larger and almost entirely destitute of hairs.—(6) "Rio Quilcace, Nov. Granata, alt. 1388 met.; flor. albid. vel pallide azurei. *Ed. André* n. 1626 *ter*." A form with densely hirsute pubescence without subjacent tomentum, with small, scarcely lobed leaves, and fruit with a few stiff hairs. According to M. André's drawing, the sepals are of a light bluish colour, the projecting ribs on the outer side green, the petals shorter than the sepals, also light blue; coronal threads blue, white at the base, smaller ones violet; ovary downy, stigmas green.

The forms of *P. fœtida*, like those of *P. suberosa*, are so numerous and pass one into the other by so many gradations as to be almost inextricable as herbarium specimens. It is probable that in a fresh state it would be more easy to disentangle the forms and to correlate the different degrees of pubescence &c. with the local conditions under which the plant grows. MM. Triana and Planchon prefer to regard all or most of the forms as distinct species; but, considering that the distinctive characteristics are adaptive rather than congenital or phyletic (see Trans. Linn. Soc. vol. xxvii. p. 621), it seems preferable to regard them as modifications of one very variable type. The character relied on by MM. Triana and Planchon to separate *P. fœtida* ("fruit hérissé de poils") from *P. hispida*, DC. ("fruit glabre"), does not, in my experience, deserve so much consideration as the authors cited give it.

7. P. ALNIFOLIA, *H. B. K. Nov. Gen. et Sp.* ii. p. 136; *Mast. in Flor. Brasil. l. c.* p. 549, *pro parte*; *Triana & Planch. l. c.* p. 165.

"Salento in monte Quindio, Nov. Granat., alt. 2500 met.: flores albidi roseo-tincti [casu foliorum] racemosi; baccæ sphæric. virides, *Ed. André* n. 2323. Prope Tuquerres, Nov. Granata, alt. 3100 met.: flores intus albi, extus violascentes; baccæ magnitud. cerasi acidi, matur. lutescent. *Ed. André* n. 1011 pro parte."

8. P. BOGOTENSIS, *Benth. Pl. Hartweg.* p. 118; *Triana & Planchon, l. c.* p. 162.—P. alnifolia, *Mast. l. c.* p. 549 *pro parte.*

"Quetame et Susumuco, Cordill. orient. Nov. Granat., alt. 1000 met.: flores albi extus sordide violacei, fructus breviter pedunculati virides, *Ed. André* n. 1011. Rio Funza prope cataractam Tequendama, Nov. Granat., alt. 2600 met., *Ed. André* n. 1380; Sibate, Fusagasugá, Nov. Granat., alt. 2300 met. n. 1011 (*bis*); Arbelaez prope Pandi, Nov. Granat., alt. 1500 met.: flores albi; corona obscure violacea."

In my former papers I had considered this a variety of *P. alnifolia*; but the examination of M. André's specimens and analyses, and the absence of strictly intermediate forms, lead me to concur in the view of MM. Triana and Planchon, who retain it as a distinct species. It differs from *P. alnifolia* in its much denser, more velvety indumentum, in its shorter peduncles, in the outer threads of the faucial corona, which are capitate, not falcate at the end as they are in *P. alnifolia.* The character relied on by MM. Triana and Planchon, as to the double rim at the base of the flower-tube, is not to be found in all the specimens of *alnifolia.*

9. P. PALA, *Planchon & Linden MSS., ex Triana & Planch. l. c.* p. 162.

"Dolores (Cauca), Nov. Granata, alt. 1855 met.: flores albi, corona externa violacea apice alba; ovarium viride, stamina pistillumque nigro-violacea. *Ed. André* n. 2838; vulgo 'Tausilla.' Jimenes, Rio Dagua, Nov. Granat., alt. 490 met.: lobi extern. virides, intern. albi, corona extern. basi virid. radiis basi violac. apice lut., coron. intern. læte virid. centro cum tori basi violac.; ovar. velutin., bacca nigresc.; variat fol. angustior. bilob. luteo-maculatis, *Ed. André* n. 2518. Cañitas (Cauca), Nov. Granat., alt. 1256 met.: flos albus, planta humilis in sepibus regionis aridæ Caucanæ frequens, *Ed. André* n. 1011 pro parte. Naranjo ad Rio Dagua, Nov. Granat., alt. 590 met., *Ed. André* n. 1807. ? Ad ped. occid. mont. ignivomi Corazon prope San Florenzio, Ecuador, *Ed. André* n. 1807—fructus oblongo-ovoideus glabrescens. An recte huc referenda?"

Allied to *P. alnifolia*, but with shorter peduncles, rounder leaf-lobes, and smaller flowers.

10. P. ANDREANA (§ DECALOBA), *Mast.*, sp. nov.; ramis flexuosis compressis sulcato-striatis puberulis; foliis 6 cm. long. 3½ cm. lat. coriaceis, superne glabrescentibus, subtus præsertim ad nervos pilosiusculis, e basi truncata vel rotundata oblongis, trinerviis, nervis radiantibus, apice bilobo, lobo intermedio obsoleto, lobis ovatis mucronulatis, glandulis 4–6 orbicularibus ad basin folii per paria dispositis; petiolo 12 mm. longo canaliculato, eglanduloso; stipulis lineari-subulatis quam petiolus dimidio brevioribus; pedunculis solitariis vel geminis quam petioli triplo longioribus; bracteis lineari-setaceis; floribus diamet. 5 cm. et ultra, tubo brevi patelliformi basi vix intruso; sepalis glabriusculis e basi lata oblongis obtusis, ad margines pallide membranaceis; petalis oblongis obtusis quam sepala parum brevioribus; corona fauciali e filis liguliformibus 1-seriatis quam petala parum brevioribus constante, corona media membranacea tubulata erecta longitudinaliter plicata margine superne inflexa denticulata, corona inframediana, tubulata crassiuscula quam præcedens paulo breviore, corona basilari basin gynandrophori angulati glabri cingente membranacea apice inflexa denticulata; ovario subgloboso dense flavido-villoso, stylis puberulis.

Patr. "Ad La Laja prope Ipiales, Nov. Granat. meridion., alt. 2900 met.: flos undique obscure violaceus, *Ed. André* n. 3478."

Allied to *P. alnifolia* in the foliage, but very different from all the near allies in its larger flowers of a violet colour, and in the singular arrangement of its corona.

11. P. CHELIDONEA, *Mast. in Gard. Chron.* July 12, 1879, p. 40, fig. 5.

"Niebli, prope Quito in temperatis reipubl. Æquator.; folia subtus violascentia, *Ed. André* n. 1110." Corazon in Ecuador, *Sodiro*!

Remarkable for its foliage and the structure of its pollen-grains. M. André's specimens are without flowers; but the flowers were described and figured in the 'Gardeners' Chronicle' *supra citat.*, from specimens that were produced in the garden of J. Anderson Henry, Esq., near Edinburgh.

12. P. ANFRACTA, sp. n. (§ DECALOBA), *Mast. & André.*—Puberula; caule subangulato striato; petiolis brevissimis (6 millim.), apice biglandulosis; stipulis setaceis deciduis; foliis coriaceis ocellatis transverse oblongis, 3-nerviis, basi cordatis, apice truncato-bilobis, lobis divergentibus ovato-triangulis; pedunculis quam petioli vix longioribus; bracteis setaceis pinnatilobis deciduis; floris tubo lato patelliformi, basi intruso; sepalis oblongis obtusis; petalis conformibus minoribus; coronæ faucialis filis liguliformibus petaloideis petala subæquantibus; corona media præcedenti approximata carnosa annulari, apice deflexa; corona ad basin gynophori deficiente.

"Rio de la Mona in decliv. occid. montis Chimborazo, Ecuador; flor. albidi vel luteoli, *Ed. André* n. 4066."

Near to *P. Vespertilio*, L., especially in the foliage; but the arrangement of the corona is quite different.

13. P. RUBRA, *Linn.*, *Mast. in Flor. Brasil. l. c.* 589 (ubi folia per imprudentiam triloba descripta).

"Tocaima, Nov. Granat., alt. 550 met.; flores albi; fructus sphæric., *Ed. André* n. 1807."

14. P. CAPSULARIS, *Linn.*, *Mast. in Flor. Brasil. l. c.* 589; *Triana & Planchon*, *l. c.* 158.

"Rio de la Vieja prope Cartago, Nov. Granata, alt. 980 met., Martio, n. 2418; Piedra de Moler ad pedem occid. montis Quindio, Nov. Granat., alt. 994 met., Martio, *Ed. André.*"

M. André describes the flowers as pale green on the outside, the sepals white flushed with rose, the petals much smaller, white; coronal threads white, violet at the base; ovary pubescent green; fruit deep red, opening ultimately from above downwards by six valves, snow-white in the interior; seeds pearly grey.

15. P. LUNATA, *Willd.*, *Mast. in Flor. Brasil. l. c.* 552.

"El Salado, prope Guayaquil, Ecuador, Julio, in arboribus regionis aridæ maritimæ. Cartago, in valle flum. Cauca, Nov. Granat., alt. 990 met., Martio, n. 4143; flores albidi, extus viridescentes, suavissimi, *Ed. André.*"

To this species probably also belong the following:—n. 78, gathered at La Guayra, Venezuela, November 1875, having leaves only, much resembling those of the Brazilian *P. retusa*; but on other specimens of *P. lunata* in the Kew herbarium the upper

leaves have quite the very narrow dimensions of those in M. André's specimen. Under the same number is another specimen gathered by M. André near Naranjo (Cauca), New Granada, which has an ovoid green fruit the size of a large cherry, but with no flowers. Another imperfect specimen, probably belonging to the same species, is n. 154, gathered at La Guayra, Venezuela, in very dry places.

16. P. ERYTHROPHYLLA, *Mast. in Flor. Brasil. l. c.* 554, *excl. syn.* P. trisetosa, *DC.*

"Armada in Cordill. meridion. Nov. Granat., alt. circit. 1040 met. Folia supra violaceo-viridia, conspicue depicta, subtus violacea; flores desunt, *Ed. André* n. 3426;" *Goudot*, in Nov. Granat. n. 2!

When I originally published this species, I was in doubt whether the *P. trisetosa* of DC. was not identical with this. M. André's specimens, though without flowers, induce me to consider the two distinct.

17. P. SANGUINOLENTA, *Mast. in Gard. Chron.* 1868, p. 1162, et 1874, vol. ii. p. 227 *c. ic. xylog.*; *Flor. Brasil. l. c.* 559; *Journ. Roy. Hort. Soc. Lond.* vol. iv. (1872) p. 135.

"Chuquiribamba, Ecuador, alt. 2500 met., *Ed. André* n. 4446."

M. André well says of this species, "habitu, forma coloreque florum distinctissima." He describes the nerves of the leaves as lutescent, which is not visible in the dried state, and the flowers as "kermesini." Garden specimens derived from Colombia showed in one case reddish-violet flowers, in the other flowers of a rosy-pink hue. The form of the pollen-grain as observed by Mr. W. G. Smith, and figured at p. 227 of the 'Gardeners' Chronicle' for August 22, 1874, is quite different from that of most other species, being globose, with a rugose surface and numerous foramina.

18. P. TRINERVIA, *Mast. l. c.* 558; *Triana & Planchon, l. c.* 178.

"La Cruces, Gallego, in montibus Quindio, Nov. Granat., alt. 2500–3200 met., Martio: caules graciles e fruticum ramis eleganter pendentes; Fuchsiis nonnullis forma florum affinis, *Ed. André* n. 2280."

The calyx is described by M. André as carmine-red, the coronal threads white, the stamens violet, the stigmas green.

19. P. Seemanni, *Grisebach in Bonplandia*, 1858, p. 7; *Mast. in Flor. Brasil. l. c.* 559.—P. incana, *Seem. Fl. Panam., non Ker, ex Griseb.*

"Inter Quetame et San Miguel in Cordill. orient. Nov. Granat., alt. 1500 met.: lobi pallide lilacini, coronæ radii alternatim albo- et violaceo-striati, *Ed. André* n. 1070. Villavicensio ad ped. orient. Andium Bogotens., Nov. Granat., 500 met., *Ed. André* n. 1070 (*bis*). Differt a *P. maliformi* (*P. ornata*, H. B. K.) fol. cordiform. vix mucronatis haud ellipticis nec ovatis, bracteis multo minoribus, sepalis petalis radiisque coronæ majoribus, *Ed. André.*"

20. P. maliformis, *Linn., Mast. in Flor. Brasil. l. c.* 594; *Triana & Planchon, l. c.* 149.

"Viota, Nov. Granata, alt. 550 met.: sepala ovata viridia; petala acuminata, ante apicem galeata, extus apiculata viridia, intus viridia violaceo punctata; coronæ radii pulchre violacei; filamenta viridia violaceo punctata; antheræ luteæ; ovarium flavescens: vulgo 'Chulupa,' *Ed. André* n. 1776. Piedra de Moler prope Cartago, Nov. Granat., alt. 990 met., *Ed. André* n. 1776 (*bis*)."

MM. Triana and Planchon describe a var. *β. pubescens* from the banks of the Magdalena, differing from the type solely in the pubescence of the underside of the leaves.

21. P. ligularis, *Juss., Mast. l. c.* 560; *Triana & Planchon, l. c.* 149.

"Palmilla, Quindio, Nov. Granat., alt. 1900 met., Martio: folia subtus violacea; fructus maximus edulis vulgo dicitur Granadilla."

M. André's specimens show the foliage only; but that is unmistakable.

22. P. macrocarpa, *Mast. in Gard. Chron.* 1869, p. 1012; *Flor. Brasil. l. c.* 598, t. 115; *Journal of Royal Horticultural Society*, vol. iv. (1872) p. 137.—P. quadrangularis, *Triana & Planchon, l. c.* p. 147.—P. quadrangularis, var. sulcata, *Jacq., teste Triana & Planchon, l. c.*

"Cali (Cauca), Nov. Granata, alt. 1030 met., Aprili, et Cartago alt. 989 met., n. 285. Carare ad rip. flum. Magdalenæ, Nov.

Granat. Dec.: "Calycis lobi lilacini; coronæ radii violacei striati; fructus maximus oblongus edulis. 'Badea' incolarum, *Ed. André.*"

MM. Triana and Planchon, whose monograph was issued before the publication of the plate of this species in the 'Flora Brasiliensis,' refer it to the original *P. quadrangularis.* I have entered at length into the discussion of the distinguishing characteristics in the publications above cited. In cultivation the foliage, stipules, the form and colour of the flower, the fruit and more especially the disposition of the corona, are quite distinct from either those of *P. quadrangularis* or of *P. alata.*

23. P. LONGIPES, *Juss., Mast. l. c.* 561; *Triana & Planchon, l. c.* 151.

"Bogotá, Nov. Granata, alt. 2650 met., Decemb.: Sepala extus viridia, intus rosea, basi tumido-concava; corona rudimentaria v. fasciculus aspergilliformis radiis brevibus albis apice cœruleis. Bracteæ foliaceæ, *Ed. André* n. 735."

24. P. GUAZUMIFOLIA, *Juss., Mast. in Flor. Brasil. l. c.* 563.

"Villavicensio ad ped. Cordill. orient., Nov. Granat., alt. 600 met.: Petala albido-viridia roseo-tincta; coronæ radii alternatim albi et violacei, *Ed. André* n. 1029." M. André also adds the following note:—"*P. ornatæ* (*maliformi*, L.) affinis, differt foliis ellipticis latioribus obtusis haud apiculatis sed brevissime mucronatis; item affinis *P. nitidæ*, H. B. K., quæ planta est foliis crassis ovato-lanceolatis dentatis, florib. majoribus. Puerto nacional ad ripas flum. Magdalenæ, Nov. Granat., *Ed. André* n. 1029."

25. P. VITIFOLIA, *H. B. K., Mast. l. c.* 564; *Triana & Planchon, l. c.* 143.

"Naranjo ad ripas flum. Magdalenæ, Nov. Granat., Dec., nn. 234 et 270; ad Panche, Nov. Granat., alt. 1320 met.; prope urbem Fusagasuga in Cordill. orient., Nov. Granat., alt. 1800 m., n. 270; Carare, Magdalena, n. 270. Flores undique coccinei vel viride scarlatini (excepta corona alba) .... fructus oblongus, haud maturus viridis albo-punctulatus .... In silvis primævis, crescens in arboribus haud proceris, *Ed. André.*"

26. P. SPRUCEI, *Mast. in Flor. Brasil. l. c.* 568.

"Rio Peripa, prope Guayaquil, Ecuador, alt. 200 met.; flores extus virides, intus albidi, *Ed. André* n. 4309 *bis.*"

27. P. REFLEXIFLORA, *Cav.*, *Mast. in Flor. Brasil. l. c.* 569.

"Balsapamba, ad ped. occ. mont. Chimborazo, Ecuador, alt. 300 met.; flores rosei, extus virides, dorso lineati, *Ed. André* n. 4034 *bis*;" in vicin. Guayaquil, Ecuador, "folia subtus violacea, *Ed. André* n. 4034 *bis*; prope Babahoyo ad ripas Rio Guayas, Ecuador, *Ed. André* n. 4068."

28. P. LORIFERA (§ GRANADILLA), *Mast. et André*, sp. n. (Tab. XX. figs. 4, 5); glaberrima; caule gracili tereti sulcato-striato; petiolis gracilibus (12–15 mm.) glandulis stipitatis 2–4 præditis; foliis 3–3½ cm. tenuibus glaucescentibus cordato 3-lobis, lobis oblongis obtusis remote serrulatis medio multo majore; stipulis petiolos æquantibus foliaceis oblique semilunaribus mucronulatis; pedunculis solitariis foliis axillantibus subæquilongis; bracteis parvis foliaceis liberis; floris tubo 3 cm. glabro cylindrato tubulato, limbo quam tubus longiore; sepalis oblongis dorso sub apice corniculatis; petalis conformibus quam sepala subbrevioribus; corona fauciali e filis 2–3- (pluri-?)seriatis constante, filis externis liguliformi-spatulatis petaloideis flexis, quam petala parum brevioribus, filis interioribus gradatim minoribus; corona media e tubo versus basin enascente erecta membranacea margine superne dentato-laciniata; corona basilari gynandrophorum gracilem angulatum cingente membranacea cupulata; ovario elliptico sulcato puberulo, stylis clavatis ovario longioribus.

"Peripa, Ecuador occident., alt. circa 200 met. Flores kermesini, concolores; folia glaucescentia; alabastri extus virides, *Ed. André* n. 4447 *bis*."

29. P. RESTICULATA, sp. n. (§ GRANADILLA), *Mast. et André*; glabra, ramis subangulatis gracilibus rigidis; foliis 7 cm. lat., 5 cm. long., membranaceis subpeltatis suborbicularibus, antice breviter 3-lobis, lobis ovatis obtusis subæqualibus divergentibus; petiolis laminas subæquantibus vel superantibus, gracilibus, glandulis parvis stipitulatis onustis; stipulis 12 mm., foliaceis, oblique oblongis, acutis, serrulatis; pedunculis gracilibus petiolos fere duplo superantibus; bracteis foliaceis lanceolatis flori approximatis; floribus diametro 5 cm.; sepalis longe foliaceo-mucronatis; coronæ faucialis pluriserialis filis extimis quam petala tertia parte brevioribus, ceteris gradatim minoribus, corona media ....; ovario ellipsoideo violaceo, stylis basi deflexis gracilibus; fructu 5 cm. ellipsoideo olivaceo; seminibus hastatis complanatis scrobiculatis ad margines eroso-lobulatis.

"San Florenzio in decliv. occid. mont. ignivom. Corazon, Ecuador, alt. 1580 met., *Ed. André* nn. 2568 et 3733; Cartago, Cauca, Nov. Granata, alt. 990 met., fructûs pulpa edulis, *Ed. André* n. 2568 (*bis*);" Quebrada de Armada. Cauca, Nov. Granat., alt. 990 met.: "specimen unicum floribus carens in regione pluviosa lectum *Ed. André* n. 3904 *bis*."

A species closely allied to ***P. alba***, Link et Otto, and of gardens, also to ***P. glauca*** of Aiton, and more remotely to ***P. stipulata*** of Aublet; but recognizable by its slender wiry stems, the shallow leaf-lobes, the absence of glaucous hue, and the long flower-stalks. As great confusion exists as to the species just named, I append in a note at the end of this communication (p. 44) the characteristic distinctions between them.

In addition to the species before mentioned, there are in M. André's collection a few specimens too imperfect to be determined, but sufficiently interesting to be briefly mentioned. No. 2143 *bis*, collected on Mount Quindio, has slender glabrous sulcate stems, membranous peltate ovate-acute 3-nerved leaves, with one triangular central lobe at the apex and indications of lateral lobes. The large reniform stipules are leafy and ciliato-dentate. If a true *Passiflora*, it is very distinct from any other yet recorded.

No. 1739, gathered near Viota, New Granada, has glabrous striated stems, subcoriaceous leaves divided to the base into three linear lanceolate lobes; petioles much shorter than the blade, and with small stipitate glands; stipules large, leafy, reniform, acute. The others present no remarkable characteristics, and are probably referable to well-known species.

DESCRIPTION OF THE PLATES.

PLATE XIX.

Figs. 1–4. *Tacsonia floribunda*, var. *major*. 1, leaf; 2, flower; 3, vertical section of flower showing arrangement of corona. All of natural size.

PLATE XX.

Figs. 1–3. *Passiflora eminula*. 1, flower, nat. size; 2, section showing corona and gynophore, enlarged; 3, one of the outer threads of the corona, enlarged.

Figs. 4, 5. *Passiflora lorifera*. 4, upper leaf and stipules; 5, section of flower. Both figs. nat. size.

Note.

The following synonyms and characters apply to the species referred to on p. 43.

P. STIPULATA, *Aublet, Hist. Plant. Guayan.* (1775), tab. 325; *Mast. in Flor. Brasil. l. c.* 567; *nec Triana & Planchon.*

P. caule tereti glabro; foliis latioribus quam longioribus subcoriaceis glabris, subtus glaucis, basi rotundatis, vix peltatis, palmatim 3-lobis, lobis minime altis, late divergentibus, ovatis obtusis vel acuminatis integris, petiolis 5 cm. long., glandulis pluribus sessilibus onustis; stipulis maximis 4–5 cm. long. foliaceis oblique oblongo-ovatis vix acutis; pedunculis petiolo brevioribus; bracteis parvis foliaceis a flore distantibus; ovario ellipsoideo pruinato. Cæt. non visa.—Descriptio ex spec. a von Rohr in Guian. Gallic. (Herb. Mus. Brit.) et ab Hancock in Guian. Britan. lectis (Herb. Kew), comparatâ icone Aubletii.

P. GLAUCA, *Solander in Aiton, Hort. Kew.* ed. i. (1789) vol. iii. p. 308; *Jacquin, Hort. Schœnbrunn.* iii. p. 270, t. 384; *Ker in Bot. Reg.* t. 88; *Mast. in Flor. Brasil. l. c.* 567; *nec Triana & Planchon.*

P. foliis latioribus quam longis carnosulis glabris, subtus glaucis, basi cordatis, subpeltatis, antice fere ad medium 3-lobis, lobis ovatis acutis integris eglandulosis; petiolis (5 cm.) sæpius eglandulosis; stipulis 3 cm. oblique oblongis acuminatis integris; pedunculo petiolum subæquante vel manifeste breviore; bracteis parvis; sepalis ecorniculatis; coronæ faucialis pluriserialis filis extimis petala æquantibus.—Character ex spec. a cl. Solander in hort. Kew. anno 1780 lect. et in herb. Mus. Brit. asservat. Patria forsan Mexico vel Venezuela.

P. ALBA, *Link et Otto, Ic. Plant. Rar.* t. 33; *Triana & Planchon, l. c.* p. 152 (*absque synon.*); *Mast. in Flor. Brasil. l. c.* 611, speciminibus quibusdam Brasiliensibus, huic speciei forsan perperam tributis, exceptis.

P. foliis latioribus quam longis, basi vix cordatis, subpeltatis, antice ad vel ultra medium 3-lobis, lobo medio longiore, omnibus oblongis obtusis vel acutis mucronulatis, intus prope basin ad marginem glanduloso-serrulatis; petiolis glandulosis vel eglandulosis; stipulis foliaceis oblique oblongo-lanceolatis integris; pedunculis petiolum subæquantibus vel eo longioribus; bracteis magnis foliaceis floris tubum velantibus; sepalis longe foliaceo-cornutis; coronæ faucialis filis externis quam petala tertia parte brevioribus.—P. atomaria, *Planchon, l. c.* p. 153; *Mast. l. c.*—P. adenophylla, *Mast. l. c.*—*An huc* P. subpeltata, *Ortega, Decad.* p. 78 (1800)?

Hab. in Mexico, *Ruiz et Pavon* in herb. Mus. Brit. sub nom. *P. luteæ*!; et etiam sub nom. "*P. holosericeæ* de Mexico"!; entre Ciudad Real & Cacaté, *Linden* 897!; *Galeotti* n. 5664!; *Hahn* 2437!; *Liebmann* 33 et 34!; Ins. Trinidad, *Fendler* 374!; in Nov. Granata, Bogotá, *Triana*!; *André* spec. cult. ex semin. in Nov. Granat. lect.!; An specimina Brasiliensia a me olim ad hanc speciem tributa ad aliam potius pertineant postea est inquirendum.

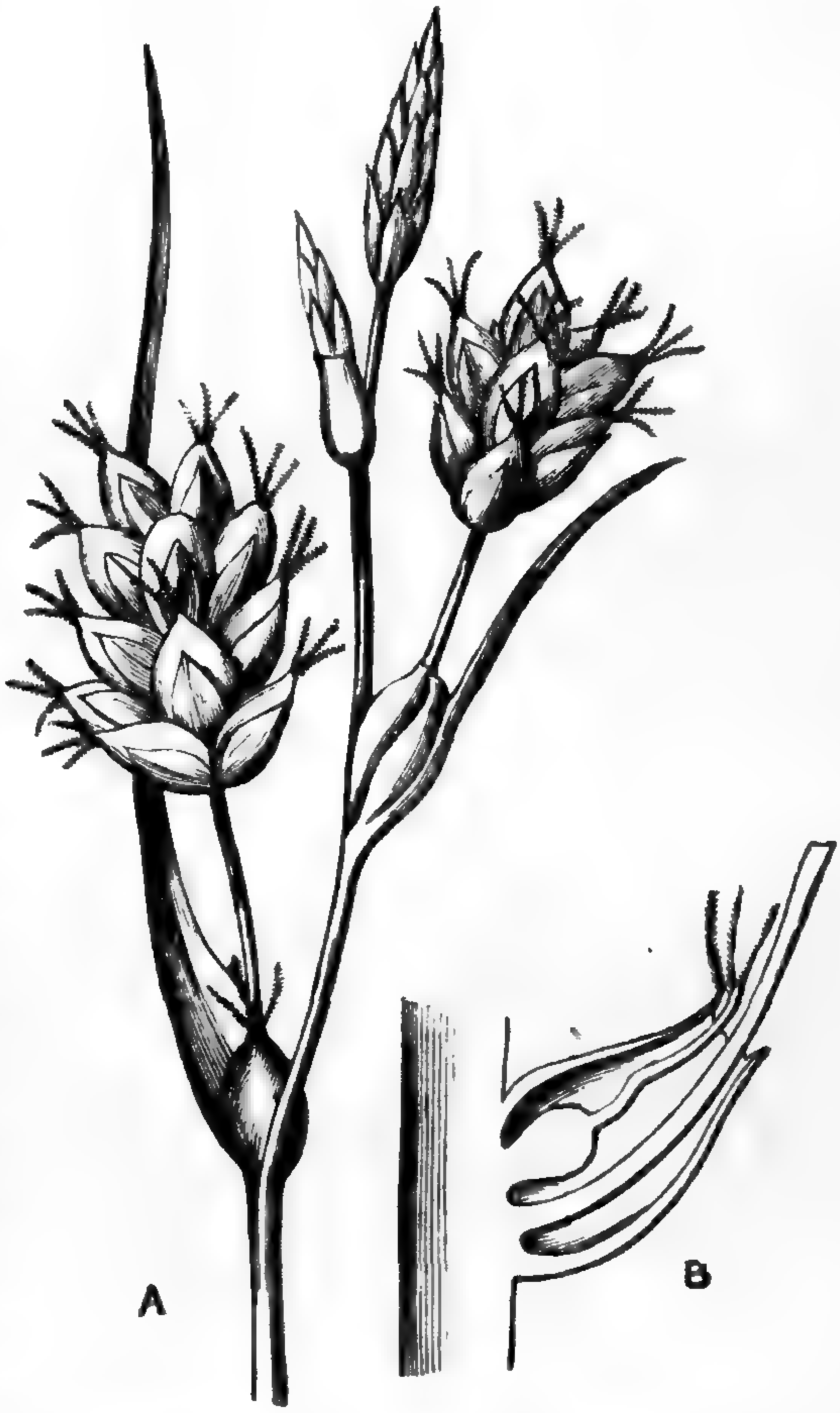
P. RESTICULATA, *Mast. & André. Vide suprà*, p. 42.

Teratological Notes on Plants.—I. By Henry N. Ridley, M.A., F.L.S., Assist. Botanical Department, British Museum.

[Read November 2, 1882.]

1. *A Monstrosity of* Carex glauca, *Scop.*—The specimen about to be described was found on a grassy down above Durleston Bay, at Swanage in Dorsetshire. It consists of a culm which bears two female and two terminal male flower-spikes; both the female spikes are supported on peduncles of some length, (1 centim. in the case of the lowest,) which spring from the interior of utricles; each utricle contains, in addition, a female flower, exteriorly to which arises the peduncle. The lowest male spike springs, in like manner, from a much-aborted utricle; but the peduncle is so short that it hardly protrudes from it. The bract which subtends this utricle is truncate and broadly dilated, and bears a considerable similarity to the utricular bract at the base of the flower-spikes in *Carex polystachya*, *C. Hartwegii*, &c. The specimen also illustrates very clearly the homology of the seta which is characteristic of the Unciniæ and of the group of Carices known as the Psyllophoræ. Cases have been recorded of the seta bearing rudimentary flowers (Linn. Journ. xiv. p. 154); and there can be little doubt that we have in this instance an example of reversion of the seta to something like its own original form and proportion. In the case of Carices with

Fig. 1.



A. Monstrosity of *Carex glauca*, Scop., showing peduncles of the flower-spikes emerging from utricles.

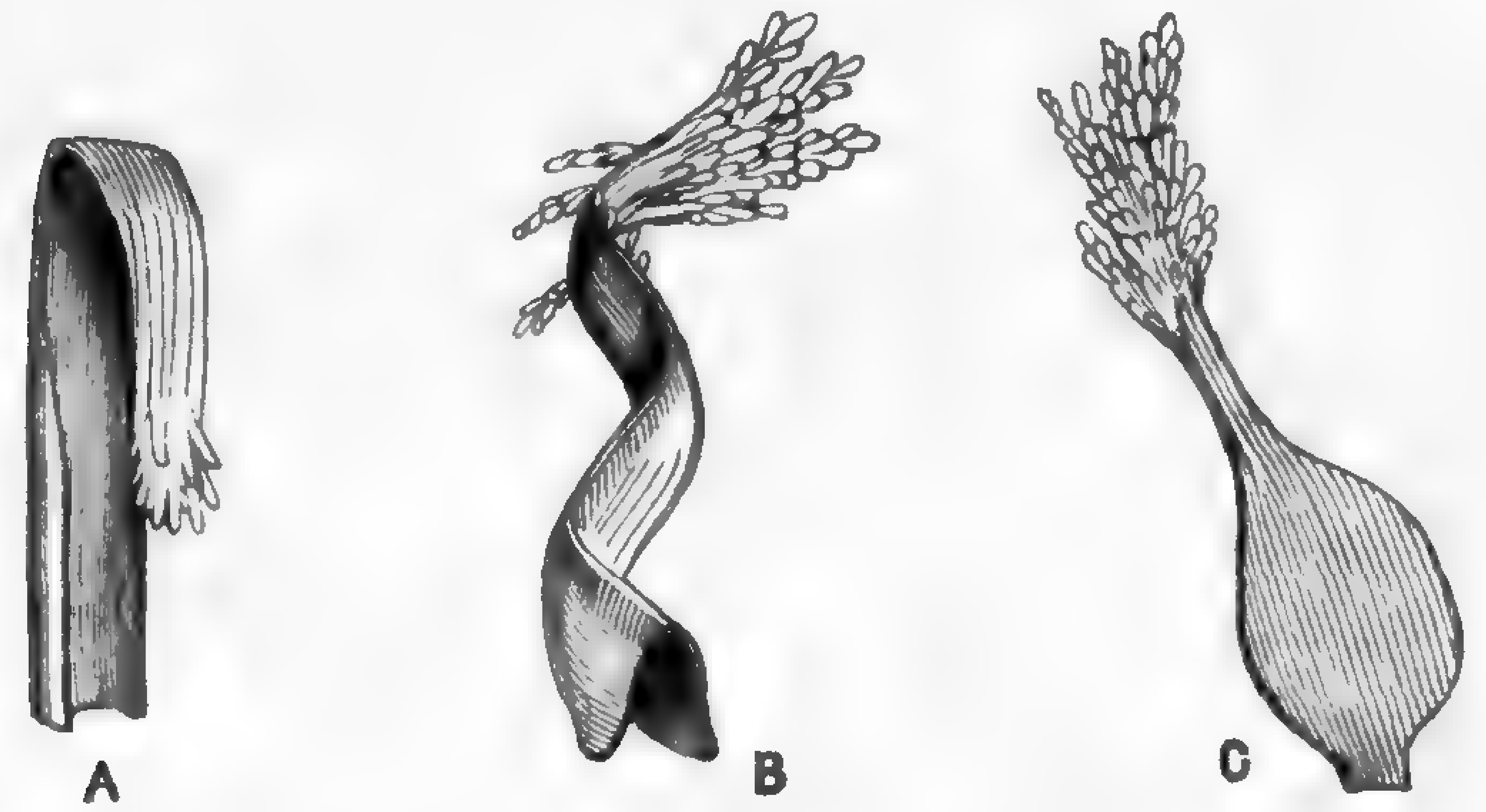
B. One of the utricles in section, showing the positions of the ovary and the peduncle.

compound spikes a similar monstrosity occurs; in these, however, the peduncle is very short, and hardly protrudes from the utricle.

2. *A Case of Pistillody in* Lolium perenne, *Linn.*—The subject of this note was found growing in a grass-field near Hendon; a considerable number of plants, all similarly affected, formed a conspicuous patch among the normal form, from which they were distinguished by the rather distant, much swollen spikelets. On opening a flower, no reproductive organs were visible, their place being taken by a number of glumes or glume-like bodies; the most exterior of these, which corresponded in position to the stamens, were green linear glumes, the apices of which were abruptly bent down, and terminated by a number of short hairs having the nodulose character of the stigmatic hairs (fig. 2 A). Interior in position to these were one or more conduplicate glumes bent laterally in a zigzag manner; these bore similar but longer hairs upon the midrib and margins, and in greatest quantity upon the apex (fig. 2 B). In addition to these there was a tuft of about six small oval transparent leaves, each of which was terminated by a single stigmatic arm—in fact, single carpellary leaves without any trace of ovules (fig. 2 C).

The specimens illustrate clearly the mode of transition from glumes into pistils. I can find no similar* case recorded; but Gen. Munro mentions a case (Linn. Trans. xxvii. p. 7) in which the points of the anthers of a bamboo were tipped with im-

Fig. 2.



A. Monstrous stamen of *Lolium perenne.*

B and C. Modified glumes replacing the reproductive organs in *Lolium perenne.*

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[*] For an analogous, not identical, case, see Journ. Linn. Soc. vii. p. 121.

perfect styles; and it seems possible that the processes on the appendages of the stamens in certain Cyperaceæ, e. g. *Acrocarpus*, and especially in a plant nearly allied to *Galmia*, collected in tropical Africa by Dr. Welwitsch, and hitherto, as far as I can determine, undescribed, may be rudimentary stigmatic hairs.

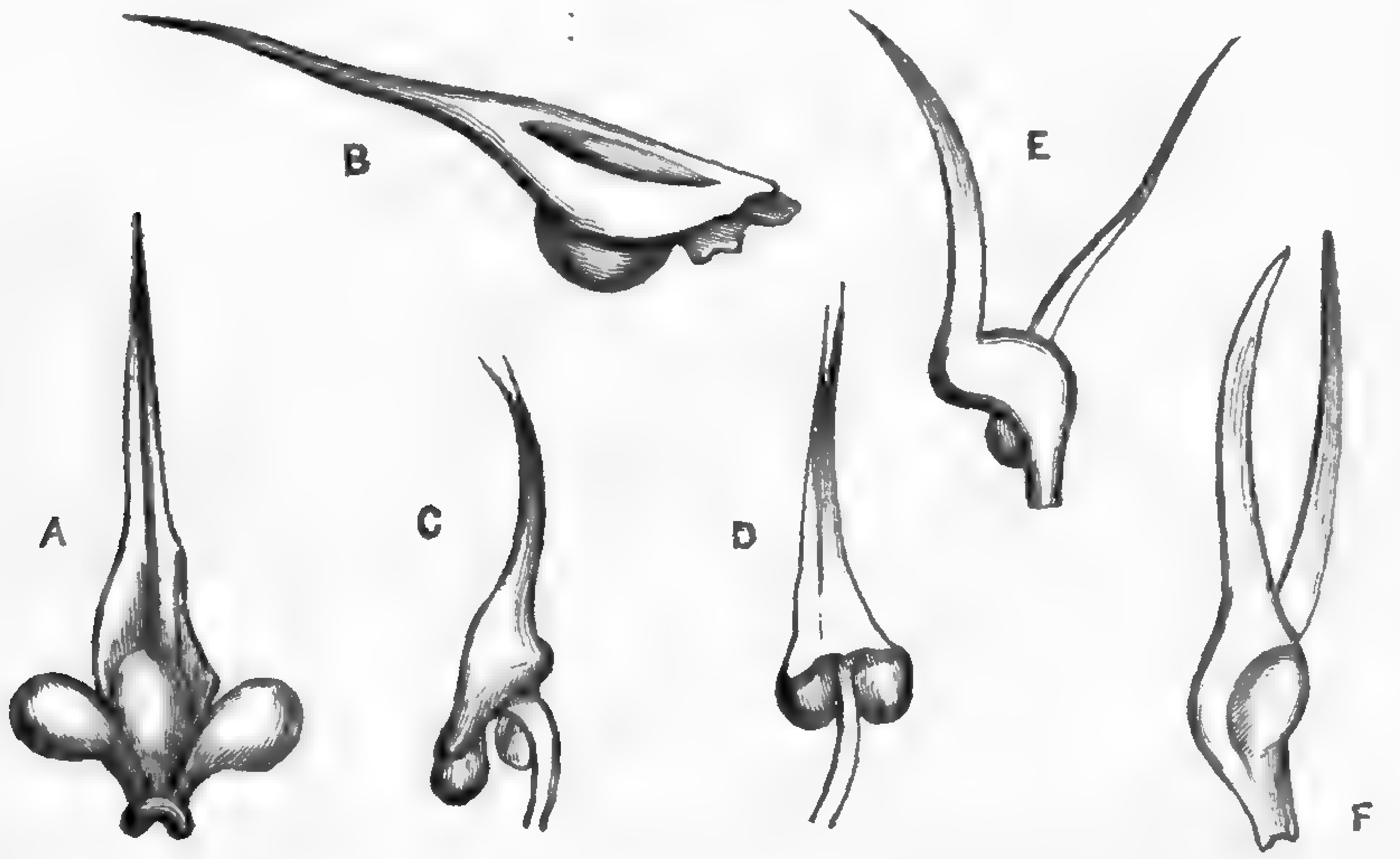
Lolium perenne is probably more subject to malformation than any other grass; this is no doubt due to its habit of growing in waste ground and by-paths, where it is especially liable to injury; and in this case, from the fact that all the plants affected were growing close together in a patch, while the others in the field were unaffected, it is probable that the malformation was due to some accident to the grass at that spot.

3. *Note on* Equisetum maximum, var. serotinum (var. proliferum, *Milde*).—A specimen of *Equisetum maximum*, answering to the description of this plant in Milde's monograph of the order, occurred among a considerable quantity of the normal form in Durleston Bay, near Swanage in Dorsetshire. It consists of a vegetative stem which, at some height above the ground, has produced a spike of fructification; this again passes into, and is terminated by, another vegetative portion. The whorl of leaves immediately below the annulus has taken the form of the long leaves characteristic of the fertile stem; all the ones below, however, are similar to those of a normal sterile stem. A longitudinal section of the fruiting portion shows the nodal septa at the base and upper part; they disappear, however, in the centre. The most interesting feature, however, is in the upper part of the spike, where the sporangiophores pass into the normal leaves. In the most slightly modified of these the clypeole produces from the centre an acuminate process, which is in most cases deflected, and is dark brown or black at the apex; in the more modified ones the clypeole has lost its hexagonal shape, and becomes the broad base of the leaf, the leaf-point is longer and passes insensibly into the clypeole. the pedicel is broader and flatter, the sporangia fewer. Finally, the clypeole and pedicel are quite undistinguishable from the rest of the leaf. It is noteworthy that in many cases the primarily single acuminate process becomes cleft, in one case almost as far as the sporanges.

The apical portion of the stem is similar to that of a normal sterile plant, except at the base, where there is a partial whorl of the large leaves characteristic of the fertile stem, at the base of which are one or two sporanges placed exteriorly to the leaf.

Milde, in his monograph of the Equiseta, has given this form the varietal name quoted above; this seems, however, quite unjustifiable, as it is evidently only a monstrosity, due probably to accidental circumstances. It does not appear to be at all common; and I do not find that it has been hitherto recorded as occurring in this country.

Fig. 3.



A, B. Clypeole of *Equisetum maximum* passing into a leaf, from beneath (A), from the side (B).

C, D. Another, more modified, showing the splitting of the primarily entire leaf-point.

E, F. Another, in which the leaf-point is split almost as far as the sporanges; the clypeole now merely an enlargement of the lower part of the leaf.

On a Collection of Exotic Lichens made in Eastern Asia by the late Dr. A. C. Maingay. By Dr. WILLIAM NYLANDER, F.M.L.S., and the Rev. JAMES M. CROMBIE, F.L.S.

[Read December 7, 1882.]

THE Lichens here enumerated and described were collected by Dr. Maingay in British Burmah, the Straits Settlements, China, and Japan, at intervals from 1861 to 1865. After his death they were purchased by Sir Joseph Hooker, along with the collection of Phanerogams made by him in the same regions. The Lichens consisted of specimens mounted by Dr. Maingay for his own herbarium (including numerous British species), and of a mass of fragmentary unmounted specimens contained in a sack with labels of localities attached to them. Most of the latter had become more or less putrid from dampness; and even of the former, many were destitute of spores from the same cause. The examination of both was consequently very tedious, and their determination (even where this was possible) in some cases a rather difficult task.

From what follows, it will be seen that of those which admitted of determination, some are interesting as illustrative of Lichen-distribution, and others as being new species or varieties previously undetected. These latter form a very fair proportion (nearly one fourth) of the whole number determinable.

I. *British Burmah.*

Family LICHENACEI.

Tribe PARMELIEI.

1. PARMELIA SULPHURATA, *Nyl. & Flot.* On the wooden supports of the Buddhist Monastery at Moulmein. Fertile.

2. "PARMELIA TABACINA," *Mont. Syll.* p. 327. On walls of the old Buddhist Monastery at the Pagoda, Moulmein. Sterile.

According to Nylander, this constitutes nothing typical, but only some common species (in the present case probably *P. latissima*), destroyed by urine or some ammoniacal liquid (*J. M. C.*).

Tribe PHYSCIEI.

3. PHYSCIA PICTA (*Sw.*). On Cocoa-Palms. Dagon Pagoda at Rangoon. Fertile.

Tribe LECIDEEI.

4. LECIDEA SUBALBOATRA, *Nyl.*, sp. n. Thallus albidus vel albido-cinerascens tenuis granulato-inæqualis subdeterminatus; apothecia nigra opaca superficialia plana marginata (latit. ·05–·08 millim.); sporæ 8næ, fuscæ, seriebus 4–6, uni- vel bi-loculares, longit. 0·015–0·022 millim., crassit. 0·007–0·009 millim.; paraphyses gracilescentes; epithecium et hypothecium fusca. Iodo gelatina hymenialis intensive cærulescens.—Affinis *L. alboatræ* et forsan non specie differens.

On posts. Near the Dagon Pagoda at Rangoon.

Tribe GRAPHIDIEI.

5. GRAPHIS HETEROCARPA, *Fée.* On Palm-trees. Dagon Pagoda.

Tribe PYRENOCARPEI.

6. VERRUCARIA GLABRATA, *Ach.* On bark of trees. Dagon Pagoda.

II. *The Straits Settlements.*

Family COLLEMACEI.

1. COLLEMA THYSANÆOIDES, *Nyl.*, sp. n. Thallus plumbeus lobatus adnatus mediocris, siccitate obtuse plicatus; apothecia obscure rufescentia, plana (latit. circiter 0·5 millim.), margine thallino lævi cincta; sporæ 8næ, aciculari-fusiformes 3–5-septatæ, longit. 0·040–0·065 millim., crassit. 0·004–0·005 millim.—Affine *C. leucocarpo*, Tayl., a quo differt apotheciis nudis, planis, sporis tenuioribus etc.

On *Pterocarpus indicus.* Flagstaff Hill, Malacca.

2. *COLLEMA CONISTIZUM, *Nyl.*, subsp. n. "Subspecies sit prioris, thallo sparsim isidiello-furfuraceo; apotheciis variantibus cæsio-suffusis, sporis nonnihil longioribus (usque longitudinis 0·070 millim., crassit. 0·004 millim.)."

On *Pterocarpus indicus.* Flagstaff Hill, Malacca.

3. DICHODIUM BYRSINUM (*Ach.*). On aged trees. Tanjong, Malacca; Penang and Pulo Undam. Various states.

4. LEPTOGIUM TREMELLOIDES (*L.*) On Cocoa-Palms. Near Evans Compound, Malacca. Fertile.

Var. *azureum* (Ach.). On old trees. Bukit Serindeh, Malacca. Sterile.

5. LEPTOGIUM (STEPHANOPHORON) CHLOROMELUM (*Sw.*). On Nutmeg-trees, Pulo Penang: fertile. Pringate, Malacca: sterile.

Var. COMPACTUM, Cromb., lobis minoribus magis divisis arcte aggregatis, marginibus dense furfuraceo-granulatis. On mossy trunks. Tanjong Kling, Malacca.

Family LICHENACEI.

Tribe RAMALINEI.

6. RAMALINA FARINACEA (*L.*). On Cocoa-Palms. Maline, Malacca. Sterile.

Tribe USNEEI.

7. USNEA TRICHODEA, *Ach.* On trunks of trees. Government Hill, Penang. Sterile.

8. *USNEA LEUCOSPILODEA, *Nyl.*, subsp. n. Similis priori, sed differt thallo (lævi) sorediis albis rotundatis vix prominulis variegato, nonnihil robustiore, minus diviso. Sterilis modo visa.

Near the tops of very lofty trees. Government Hill, Penang.

Tribe PARMELIEI.

9. PARMELIA TINCTORUM, *Despr.* On rocks. Singapore. Generally sterile; but one specimen with young apothecia.

10. "PARMELIA TABACINA," *Mont.* On trunks of trees. Allagajah, near Malacca. Sterile. (The specimens are probably referable to the preceding species.)

11. PARMELIA ABYSSINICA, *Nyl.* On Angsana-trees. Flagstaff Hill, Malacca. Sterile.

12. PARMELIA SUBLÆVIGATA, *Nyl.* On Cocoa-Palms. Tanga Battu, near Malacca. Sparingly fertile.

13. PARMELIA TILIACEA (*Hoffm.*). On Cocoa-Palms. Tanga Battu, near Malacca. Sparingly fertile.

14. PARMELIA SUBDISSECTA, *Nyl.*, sp. n. Sat similis *P. dissectæ* europææ, sed thallo adnato, rhizinis brevioribus; sporæ non visæ; spermatia subfusiformia, longit. 0·004–0·005 millim., crassit. 0·0005 millim.; K(CaCl) medulla erythrinose tincta; apothecia non bene evoluta visa in specimine e Malacca, sed talia adsunt in collect. Leprieur e Cayenne in Guyana; sporis ellipsoideis longit. 0·006–0·007 millim., crassit. 0·0035 millim.
On Cocoa-Palms. Tanjong, Malacca.

15. PARMELIA SUBRUPTA, *Nyl.*, sp. n. Thallus albidus adnatus orbiculari-expansus inæqualis, lineari-laciniatus, laciniis multifidis (latit. circiter 1 millim.), demum transversim rimosis, subtus pallidus, rhizinis passim visibilibus obscuratis; apothecia badio-fusca (latit. 1 millim. vel minora), margine thallino crenato vel subcrenato recepta; sporæ ellipsoideæ, longit. 0·005–0·006 millim., crassit. 0·003–0·004 millim. Iodo gelatina hymenialis cærulescens, thecæ præsertim tinctæ. Forsan specie differat a *P. intertexta*, Mont., javanica præsertim laciniis thallinis transversim diffractis. Thallus nec K nec CaCl reagens.
On Cocoa-Palms. Allagajah, near Malacca.

16. PARMELIA SULPHURATA, *Nyl. & Flot.* On Cocoa-Palms. Tanga Battu, near Malacca. Fertile. Medulla K(CaCl) orange-red.

17. PARMELIA CIRCUMNODATA, *Nyl.*, sp. n. Thallus ochroleucus adpressus laciniis discretis sinuato-multifidis et sinuato-incisis (latit. 1 millim. vel angustioribus), margine nigro-rhizinosis, rhizinis basi nodoso-turgidis (inde laciniæ margine globulis nodosis confertis circumcoronatæ), pagina infera pallida; apo-

thecia et spermogonia ignota. *Parmelia* minor, thallo K∓ (medulla tum flavente).—Affinis videtur *P. sublimbatæ*, Nyl.
On mossy trunks. Government Hill, Penang.

18. Parmelia malaccensis, *Nyl.*, sp. n. Thallus subochroleucus orbiculari-expansus, adpressus lineari-laciniatus, laciniis multifidis contiguis vel subimbricato-contiguis (latit. circiter 1 millim.), supra subconvexulis papillisque isidiosis plus minusve conspersis, subtus fuscis, rhiziuis parvulis tenuibus (at vix ullis marginalibus); apothecia badio-fusca (latit. circiter 1 millim.), margine thallino crassulo subintegro cincta; sporæ 8næ ellipsoideæ, longit. circiter 0·007 millim., crassit. circiter 0·0035 millim. Iodo thecæ solæ cærulescentes. Thallus K non reagens vel medulla leviter lutescens.—E stirpe est *Parmeliæ relicinæ*: affinis videtur *P. intertextæ*, Mont. (Javanicæ), sed ejus thallus habet isidium, marginem receptacularem alium.
On Cashew-nut trees, St. John's Hill, Malacca: sparingly fertile. Also at Allagajah, near Malacca: sterile.

Tribe Physciei.

19. Physcia picta (*Sw.*). On trees. Singapore.—*F. foliicola*, Cromb. Thallus smaller, thinner, closely adnate, sorediiferous in the centre. On leaves of *Garcinia mangostana*. Malacca: sterile.

Tribe Pyxinei.

20. Pyxine cocoës (*Ach.*). On bark of trees. Bukit Serindeh, Malacca.

21. Pyxine sorediata (*Fr.*). On trees in maritime situations. Pulo Undam, near Malacca.

Tribe Lecanorei.

22. Pannaria pannosa (*Sw.*). On the trunks of trees and on mosses. Water Islands (Pulo Undam), near Malacca; Penang.

23. Lecanora leptozona, *Nyl.*, sp. n. Thallus albidus tenuis rimulosus; apothecia rufa superficialia biatorina plana (latit. 0·5 millim.); margine (perithecio) tenui infuscato; sporæ placodinæ, loculis sat retractis, longit. 0·009–0·011 millim., crassit. 0·003 millim.; paraphyses non bene discretæ, epithecium lutescens (K purpurascens).—Accedens versus *Lecanoram cæsiorufam*, Ach., Nyl., notis autem allatis dignota.
On shady rocks. Pulo Undam, near Malacca.

24. Lecanora gangalizodes, *Nyl.*, sp. n. Similis fere *Lecanoræ gangalizæ*, Nyl. in Flora, 1874, p. 8, sed apothecia nigricanti-fuscescentia, paraphysum clavis fuscis (in *L. gangaliza*

subcærulescenti-nigricantibus et acido nitrico rosello-violascentibus). Thallus albidus tenuis conferte rimulosus (K flavescens); apothecia fusconigra innata (latit. 0·5 millim.), margine thallino tenui vel obsoleto cincta; sporæ oblongo-ellipsoideæ, longit. 0·010–0·011 millim., crassit. 0·005–0·006 millim.; paraphyses graciles, clava fuscescente (acido nitrico non aliter colorata). Spermatia longit. circiter 0·025 millim., crassit. 0·0005 millim.

On rocks, just above high-water mark. Pulo Undam, Malacca.

25. Lecanora achroa, var. phæachroa, *Nyl.* "Apotheciis subfuscis." On old posts, Malacca.

26. Lecanora prægranifera, *Nyl.*, sp. n. Thallus albidus granulatus; apothecia nigra (latit. 0·5–0·8 millim.), intus concoloria, margine thallino tenui integro cincta (demum evanescente); sporæ 8næ ellipsoideæ, longit. 0·015–0·016 millim., crassit. 0·009–0·010 millim.; paraphyses gracilescentes, epithecium et hypothecium fusca. Iodo gelatina hymenialis cærulescens, thecæ præsertim tinctæ.—Species e stirpe *Lecanoræ graniferæ*, Ach., thallo firmo granulato distincta. Thallus intus flavescens (K magis flavens).

On rugged bark. St. John's Hill, Malacca.

27. Lecanora punicea, *Ach.* On trees. Singapore.

Tribe Thelotremei.

28. Thelotrema cavatum, *Ach.* On the trunks of dead trees. Singapore.

29. Thelotrema subconforme, *Nyl.*, sp. n. Thallus macula albido-pallida rugulosa subnitidiuscula indicatus; apothecia incoloria innata, extus ostiolis minutis (latit. circiter 0·1 millim.) agminose confertis indicata; sporæ 8næ inclores oblongæ 6-loculares, loculis mediis vulgo semel divisis (inde transversim bilocularibus), longit. 0·017–0·020 millim., crassit. 0·007 millim. (iodo cærulescentes).—Species locum habens prope *T. conforme*, Fée, quod sporis gaudet majoribus.

On Lanjoot-trees. St. John's Hill, Malacca.

30. Ascidium monobactrium, *Nyl. Enum. génér.* p. 119. "Sporæ singulæ in thecis, longæ 0·140–0·160 millim., crassæ 0·027–0·035 millim. In specimine viso e Labuan sporæ longiores et usque longit. 0·230–0·240 millim., crassit. 0·022–0·030 millim. Extus comparandum cum *Ascidio domingense*, sed longe dif-

ferens sporis oblongo-cylindricis murali-divisis. Sporæ iodo cærulescunt.

On Lanjoot-trees. Malacca.

Tribe Lecideei.

31. Coccocarpia molybdæa, *Pers.* Amongst mosses on old stumps of trees. Water Islands, near Malacca. Fertile.

Var. incisa, *Pers.* On old trees. Pulo Besar and Bukit China, Malacca. An old atypical state. Sparingly fertile.

32. Coccocarpia aurantiaca (*Hook. & Tayl.*). On mossy trunks of Palms. Allagajah, Malacca. Sterile. Also a decolorate condition.

33. Coccocarpia smaragdina, *Pers.* On trees. Mt. Ophir, Malacca: fertile.

34. Coccocarpia azurella, *Nyl.*, sp. n. Thallus cærulescens tenuis vel tenuissimus, adpressus radiato-divisus, lobulis ambitu subcrenato-incisis, incisuris angustis; apothecia testaceo-rufella parva (latit. 0·25 millim. vel minora), plana immarginata; sporæ 8næ globulosæ, diam. 0·004–0·005 millim. Iodo gelatina hymenialis thecarum cærulescens, dein apicibus obscuratis. Forsan non specie differens a *Collemate blepharophoræ*, Bel., vel *Biatora Belangeri*, Mont. (quæ diversa videretur vix nisi thallo pallide glaucescente). Thallus raro integre suborbicularis (latit. 2–3 millim.), sæpius lobulis incisis subdispersis, crassit. vix 0·02 millim. vel tenuior; syngonimia difformia, sæpe cylindracea, stratis nonnullis superpositis (non vero scytonemoidea); gonimiis glaucescenti-cærulescentibus (diametris 0·007–0·009 millim.). Thecæ altit. circiter 0·035 millim., pyriformi-oblongæ, confertæ; paraphyses gracillimæ parcæ.

On Cocoa-Palms. Malacca.

35. Coccocarpia epitripta, *Nyl.*, sp. n. Forsan nimis parum distincta a *C. azurella*, thallo nonnihil majore, centro minute conferte isidiello. Thallus subtus tenuiter albo-rhizinosus. *C. smaragdina* est major, planior, supra glabra, rhizinis pallidis tomentum tenue efficientibus.

On old trunks. Police-station at Durian, Malacca: sterile. Associated apparently with *Lecidea parvifolia*, var. *fibrillifera*, Nyl. Sterile.

36. Lecidea proboscidina, *Nyl.*, sp. n. Thallus glaucescens tenuis inæqualis subleprosus; apothecia pallide carnea (latit. 1 millim. vel minora), superficialia, margine pallido; sporæ 8næ

oblongæ, longit. 0·007–0·010 millim., crassit. 0·0035–0·0040 millim. Iodo gelatina hymenialis non tincta (lutescens). Affinis *Lecideæ luteæ*, Dcks., a qua jam differt apotheciis minus læte tinctis et sporis brevioribus. Sed accedit differentia maxima spermogoniis proboscideo-cylindricis pallidis erectis (latit. 0·3–0·4 millim., crassit. circiter 0·2 millim.); spermatia breviter ellipsoidea vel subglobosa, longit. 0·003–0·004 millim., crassit. 0·002–·0·003 millim.

Overspreading decayed mosses on *Pterocarpus indicus*. Tanjong Kling, Malacca.

37. LECIDEA MALACCENSIS, *Nyl.*, sp. n. Thallus albido-pallens, tenuis, sublævigatus; apothecia rufa plana superficialia marginata (latit. circiter 0·5 millim.), intus incolori-pallida; sporæ 8næ, bacilliformes 7-septatæ, longit. 0·023–0·028 millim., crassit. 0·0035 millim.; paraphyses graciles. Iodo gelatina hymenialis cærulescens, dein luteo-violascens.—Species est e stirpe *Lecideæ bacilliferæ*, Nyl. (facie vero fere *Lecideæ acerinæ*, Pers.).

On bark of trees. Malacca.

38. LECIDEA DISSIMULABILIS, *Nyl.*, sp. n. Thallus sordide pallidus, tenuis vel tenuissimus, continuus, rugulosus aut sublævis, obscure limitatus; apothecia obscure rufa vel electrino-nigricantia, superficialia, plana, marginata (latit. circiter 0·5 millim.), intus concoloria; sporæ 8næ cylindraceo-bacilliformes 7-septatæ, longit. 0·024–0·028 millim., crassit. 0·0035 millim.; epithecium incolor, hypothecium et perithecium electrina. Iodo gelatina hymenialis bene cærulescens, cærulescentia persistente.—Species facie fere *Lecideæ acerinæ*, sed pertinens ad vicinam *Lecideam bacilliferam*.

On *Calophyllum inophyllum*. Tanjong, Malacca.

39. LECIDEA SUBBACULIFERA, *Nyl.*, sp. n. Thallus albido-flavicans, tenuiter inæqualiter crustaceo-obducens, rimosus; apothecia nigra planiuscula immarginata (latit. 0·5–0·8 millim.), intus obscura; sporæ 8næ incolores oblongo-cylindricæ subbaculiformes simplices, longit. 0·017–0·019 millim., crassit. 0·004 millim.; paraphyses graciles non bene distinctæ, epithecium vage nigrescenti-obscuratum. Iodo gelatina hymenialis bene cærulescens, dein obscurata.—Species forsan e vicinis *Lecideæ gelatinosæ*, Floerke, inter europæas. Fragilis, facile destructa.

On the ground. Pullow, near Malacca.

40. LECIDEA MICROPHYLLINIZA, *Nyl.*, sp. n. Thallus pallide luridus, sat tenuiter microphyllinus, squamulis subimbricatis, crenato-incisis, decumbentibus, confertis; apothecia rufa superficialia plana marginata (latit. 0·4–0·6 millim.), intus pallida; sporæ 8næ incolores aciculares, longit. 0·026–0·038 millim., crassit. 0·001 millim. Iodo gelatina hymenialis cærulescens, cærulescentia præsertim thecarum satis persistente.—Species e stirpe *Lecideæ microphyllinæ* notis allatis distinguenda (*cf.* Nyl. L. Nov. Granat. p. 62).

Amongst short decayed mosses on bark of trees. Pulo Undam, Malacca.

41. LECIDEA VULPINA, *Tuck.*, *Nyl.* On Nutmeg-trees. Near the waterfall, Penang. Very rare, *fide* Maingay.

42. LECIDEA MEDIOCRICULA, *Nyl.*, sp. n. Thallus cinerascens tenuis subleprosus; apothecia nigra convexiuscula immarginata, intus concoloria; sporæ 8næ incolores ellipsoideæ simplices minutæ, longit. 0·006–0·007 millim., crassit. fere 0·0035 millim.; epithecium subincolor, paraphyses gracilescentes, hypothecium crasse fuscum. Iodo gelatina hymenialis cærulescens.—Species hæc accedere videtur ad *Lecideam plebejam*, Nyl., sed jam epithecio incolori distat. Apothecia latit. circiter 0·5 millim.

On the trunks of trees. Malacca. Forming irregularly spreading patches, *fide* Maingay.

43. LECIDEA LEPRIEURIOIDES, *Nyl.*, sp. n. Thallus albidus tenuis subleprosus vel furfurellus; apothecia sanguineo-ferruginea superficialia plana (latit. 0·8–1·2 millim.), margine nigro firmo; sporæ 8næ incolores fusiformes 7-septatæ, longit. 0·020–0·023 millim., crassit. 0·005 millim.; paraphyses graciles, hypothecium et perithecium nigra. Iodo gelatina hymenialis vinose fulvescens.—Affinis *Lecideæ Leprieurii*, Mont., Nyl., Nov. Granat. p. 71, sed mox distinguenda sporis minoribus. Pertinet ad stirpem *Lecideæ premneæ*.

On old trunks, Allagajah, near Malacca. On *Pterocarpus indicus*, Tanjong, Malacca. The apothecia are occasionally in other specimens (and probably normally) pruinose.

44. LECIDEA CHLOROCONIA, *Tuck. MSS.* On *Calophyllum inophyllum*. Tanjong Kling, Malacca.

As no diagnosis of this species, originally detected in New

England, has been published by Tuckerman, the following may here be given:—

> Thallus cinerascens continuus subopacus; apothecia nigra plana marginata, epithecio flavido-suffuso, intus obscura; sporæ 8næ incolores fusiformes 3-septatæ, longit. 0·014–0·016 millim., crassit. 0·0035 millim.; paraphyses mediocres; epithecium lutescens; hypothecium fusco-nigricans. Iodo gelatina hymenialis vinose fulvo-rubescens.—Species est e stirpe *Lecideæ premneæ* mox distinguenda sporis parvis. Thalamium lamina tenui sublutescens. (*W. Nyl.*)

45. LECIDEA TRIPHRAGMIA, *Nyl.* On old posts. Malacca.

46. GYROSTOMUM SCYPHULIFERUM, *Ach.* (?) On *Pterocarpus indicus.* Tanjong Kling, Malacca.

Unfortunately there are no spores in any of the specimens, though they seem referable to this or some allied species of the genus.

Tribe GRAPHIDEI.

47. GRAPHIS SCRIPTA, *Ach.* On bark of trees. Singapore. Atypical.

Var. SERPENTINA, *Ach.* On Cocoa-nut and Palms. Singapore.

48. GRAPHIS SOPHISTICA, *Nyl.* On *Calophyllum Inophyllum.* Tanjong, Malacca.

49. GRAPHIS HETEROCARPA, *Fée.* On Palm-trees, Singapore. On *Areca Catechu,* Kassang, Malacca.

50. GRAPHIS ADTENUANS, *Nyl.*, sp. n. Thallus albus tenuis rugulosus; apothecia nigra obtecta linearia longiuscula flexuosa (longit. 1–3 millim.), tenuia (latit. 0·25 millim.), epithecio rimiformi; sporæ 8næ incolores murali-divisæ, longit. 0·075–0·100 millim., crassit. 0·020–0·025 millim. (iodo cærulescentes); hypothecium incolor.—Forsan specie non differt a *G. heterocarpa* apotheciis angustatis obtectis, sporis nonnihil minoribus. Thallus K vix reagens. Sed adest in Fidshi insulis species affinis, cui thallus K fere ferrugineo-cinnabarine tingitur et sporæ sunt nonnihil crassiores (dici possit *Graphis heterocarpoides*, Nyl.). Accedit *G. subserpentina*, Nyl., Ceyloniensis.

On trees. St. John's Hill, Malacca.

Var. DETECTA, *Nyl.* Differt apotheciis denudatis, non obtectis. On *Pterocarpus indicus.* Bukit China, Malacca.

51. GRAPHIS AFZELII, *Ach.* On bark of trees. Singapore.

52. Graphis subrigida, *Nyl.*, sp. n. Thallus vix ullus visibilis; apothecia nigra linearia rigentia, sat longa (longit. circiter 3–4 millim., latit. fere 0·5 millim.), prominula nuda, epithecio rimiformi; thecæ monosporæ; sporæ fuscescentes, cylindrico-oblongæ, murali-divisæ, longit. 0·115–0·145 millim., crassit. 0·026–0·030 millim. (iodo cærulescenti-obscuratæ); paraphyses guttulis oleosis inspersæ; hypothecium incolor.—Species, ut videtur, e stirpe *Graphidis rigidæ*, Fée. Perithecium obsolete semel striatulum. Comparari possit etiam cum *Graphide flexuosa*, Nyl., e Philippinis, quæ vero sporas habet 8nas.
On Jack-fruit trees. Singapore.

53. Graphis inusta, *Ach.* On the small branches of *Anona.* Government Garden, Malacca.

54. Graphis chrysentera, *Mont.* (?) On bark of old trees. Singapore. The specimens are old and without spores; but are apparently referable to this species.

55. Medusula tricosa (*Ach.*). On Betel-Palms. Singapore.

56. Opegrapha adtinens, *Nyl.*, sp. n. Thallus macula albida opaca indicatus; apothecia nigra tenuia longiuscula flexuosa, epithecio rimiformi-angustato; sporæ 8næ fusiformes 3–5-septatæ, longit. 0·012–0·014 millim., crassit. 0·0035 millim.—Accedere videtur ad *Opegrapham vulgatam*, sed sporæ breviores et spermatia oblongo-cylindrica (vel subfusiformia), longit. 0·004–0·005 millim., crassit. 0·001 millim.
On aged trees, Tanjong, Malacca. On *Anacardium occidentale*, Bukit China, Malacca.

57. Arthonia cinnabarina, var. adspersa (*Mont.*). On *Areca Catechu.* Kassang, Malacca.

58. Arthonia spectabilis, *Flot.* On bark of trees, Allagajah, near Malacca. On *Pterocarpus indicus*, Tanjong, Malacca.

59. Arthonia subpolymorpha, *Nyl.*, sp. n. Thallus albus tenuissimus subfarinaceus; apothecia nigricantia (humida fuscescentia), oblongo-difformia, conferta (latit. 0·3–0·5 millim.); sporæ 8næ (demum fuscescentes vel obscuratæ), oviformes, 3-septatæ, longit. 0·015–0·016 millim., crassit. 0·006 millim. Iodo gelatina hymenialis cærulescens, cærulescentia persistente.—Facie fere *Arthoniæ polymorphæ*, Ach., sed ob apo-

thecia (præsertim humida) fuscescentia ad stirpem *A. variæ* (*atratæ*, Feé) pertinens et notis allatis distinguenda.

On old trees by the sea. Pulo Undam, Malacca.

60. ARTHONIA COMPLANATULA, *Nyl.*, sp. n. Thallus albus, subfarinaceus tenuissimus; apothecia nigra plana rotundata vel suboblonga (latit. 0·4–0·6 millim.), immarginata, intus obscura; sporæ 8næ incolores oviformi-oblongæ 3-septatæ, longit. 0·011–0·012 millim., crassit. 0·004 millim.; epithecium fusculum; hypothecium infra leviter fuscescens. Iodo gelatina hymenialis luteo-fulvescens.—Facie externa fere *Platygraphæ pericleæ*. Prope *Arthoniam complanatam*, Fée, disponenda, a qua differt mox sporis minoribus etc.

On the bark of Angsana trees. Tanjong road, Malacca.

61. GLYPHIS HETEROCLITA, *Mont.* On Palms. Allagajah, near Malacca.

62. GLYPHIS LABYRINTHICA, *Ach.* On Betel-Palms. Singapore.

63. GLYPHIS CICATRICOSA, *Ach.* On Cocoa-Palms. Tanga Battu, Malacca; Singapore.

64. GLYPHIS CIRCUMPLEXA, *Nyl.*, sp. n. Thallus vix ullus visibilis; apothecia nigra in stromatibus albidis depressis contorta, conferte serpentino-intricata, epithecio angustato-subpruinoso; sporæ 8næ fuscæ oblongæ seriebus 6–8 transversis 1–2-locularibus, longit. 0·023–0·027 millim., crassit. 0·009–0·010 millim. (iodo non tinctæ).—Species bene ab aliis jam sporis in loculos 2–3 divisis distinguenda.

On Betel-Palms. Singapore.

65. CHIODECTON SUBSPHÆRALE, *Nyl.*, sp. n. Thallus glaucescens tenuis opacus subleprosus; apothecia in stromatibus albis pulvinatis rotundatis aut oblongis (latit. 0·5–0·8 millim.), extus punctis nigris confertis indicata; sporæ 8næ incolores fusiformes 3–5-septatæ, longit. 0·016–0·017 millim., crassit. 0·0035 millim. Iodo gelatina hymenialis vinose fulvo-rubens.

On Horse-Mangoe trees. Tanga Battu, Malacca.

Tribe PYRENOCARPEI.

66. VERRUCARIA MASTOIDEA (*Ach.*). On thin bark. Pulo Undam, near Malacca.

67. VERRUCARIA EPAPILLATA, *Nyl.* On trunks of trees. Allagajah, Malacca.

68. VERRUCARIA SEXLOCULARIS, *Nyl.* On trees. Tanjong, Malacca.

69. VERRUCARIA SANTENSIS, *Tuck.* On aged Angsana trees. Tanjong, Malacca.

70. VERRUCARIA GLABRATA, *Ach.* On branches of trees, Malacca. On bark, Tanjong Kling, Malacca.

71. VERRUCARIA SUBGLABRATA, *Nyl. in C. Wright, Verr. Cub.* no. 104. Similis *Verrucariæ glabratæ*, Ach., sed pyrenio dimidiato; sporæ longit. 0·015–0·018 millim., crassit. 0·008–0·011 millim.—On trunks of trees. Bukit Serindeh, Malacca.

72. VERRUCARIA DENUDATA, *Nyl.* On old bark of *Calophyllum*. Tanjong Kling, Malacca.

73. VERRUCARIA OCHRACEOFLAVA, f. NUDIOR, *Nyl.*; apotheciis magis supra denudatis convexis. On *Calophyllum Inophyllum*. Tanjong Kling, Malacca.

74. VERRUCARIA HETEROCHROA, *Mont.* On Lanjoot-trees. Malacca. Frequent (*fide* Maingay).

75. VERRUCARIA TRYPETHELIZANS, *Nyl.*, sp. n. Thallus vix ullus; apothecia dispositione subtrypethelioidea (latit. circiter 0·5 millim.), prominula (pyrenio subfuscescente); sporæ 8næ incolores oblongæ 8–10-loculares, longit. 0·032–0·038 millim., crassit. 0·010–0·011 millim.—Affinis *Verrucariæ concatervatæ* (vide infra), sed apotheciis nudioribus, magis prominulis, plus minusve confluentibus, sporis paulo minoribus. Forsan revera *Trypethelium*.

On stunted Angsana trees. Tanjong, Malacca.

76. VERRUCARIA TROPICA, *Ach.* On wild Lime-trees. Malacca and Singapore.

77. VERRUCARIA ELACTESCENS, *Nyl.*, sp. n. Thallus macula alba indicatus; apothecia nigra convexiuscula (latit. 0·3–0·5 millim.), juniora subvelata, parte pyrenii immersa tenui nigra; sporæ 8næ incolores ellipsoideæ murali-divisæ, longit. 0·025–0·035 millim., crassit. 0·012–0·015 millim.; paraphyses graciles sat confertæ.—Affinis *Verrucariæ lacteæ*, Ach., a qua jam sporis majoribus differt.

On Angsana trees. Tanjong Kling, Malacca.

78. VERRUCARIA AUGESCENS, *Nyl.*, sp. n. Thallus macula alba indicatus; apothecia nigra convexa (latit. 0·5–0·6 millim.); sporæ 8næ incolores, murali-divisæ (seriebus 2–4-locularibus

transversis 6–10), longit. 0·036–0·048 millim., crassit. 0·016–0·018 millim.; paraphyses graciles confertæ.—Similis *Verrucariæ elactescenti*, sed nonnihil major et sporis majoribus. Facie fere *V. glabratæ*.

On bark of trees. Singapore.

79. Verrucaria malaccitula, *Nyl.*, sp. n. Thallus albidus, tenuissimus, maculiformis; apothecia nigra subpruinosa convexula, pyrenio dimidiatim nigro (latit. 0·5 millim. vel nonnihil minore); sporæ 8næ incolores oviformes 1-septatæ, longit. 0·026–0·036 millim., crassit. 0·012–0·016 millim.; paraphyses parcæ.—Species est e stirpe *Verrucariæ epidermidis* arcte accedens ad *Verrucariam ceyloniensem* (Mass.), a qua differt apotheciis nonnihil minoribus, sporis angustioribus etc.

On thin bark of trees. Water Islands, Malacca.

80. Verrucaria subnectenda, *Nyl.*, sp. n. Subsimilis *Verrucariæ subnexæ*, Nyl., L. Andam. p. 22, sed sporis oviformibus septo magis versus apicem disposito, inde cellula apicali breviore quam superior multo tumidiore (longit. 0·023–0·032 millim., crassit. 0·012 millim.).—Affinis est *V. subnexæ*, quæ sporas habet nonnihil minus crassas et septo fere in medio disposito (longit. 0·023–0·032 millim., crassit. 0·010–0·011 millim.). Comparanda etiam *V. anisomera*, Nyl. in Wr. Cub. no. 105.

On bark of trees. Pulo Undam, near Malacca.

81. Trypethelium Sprengelii, *Ach.* On *Pterocarpus indicus*. Pullow, near Malacca.

82. Trypethelium virens, *Tuck.* On thin bark of trees. Water Islands, near Malacca.

83. Trypethelium platystomum, *Mont.* On trunks of trees. Singapore.

84. Trypethelium nigritulum, *Nyl.* On bark. Allagajah, near Malacca.

Tribe Peridiei.

85. Endococcus exocarpellus, *Nyl.*, sp. n. Thallus proprius verisimiliter nullus; apothecia verrucaroidea, pyrenio nigro convexo prominulo subintegro (latit. 0·2–0·3 millim.); thecæ polysporæ; sporæ dilute nigrescentes oblongæ, longit. 0·005–0·008 millim., crassit. 0·002 millim. Iodo gelatina hymenialis

vinose rubescens.—Species thecis et sporis sicut in *Endococco erratico*, sed facie omnino alia (verrucarioidea).

On bark of trees. Singapore.

III. *China.*

Family COLLEMACEI.

Tribe COLLEMEI.

1. COLLEMA LIMOSUM, *Ach.* On bare earth. Shanghai.

Family LICHENACEI.

Tribe RAMALINEI.

2. RAMALINA GRACILENTA, *Ach.* On rocks. Dockyard Island, Bay of Chefoo. Fertile.

3. RAMALINA POLLINARIA, f. HUMILIS, *Ach.* Hills near Ninghai. Sterile.

Tribe PHYSCIEI.

4. PHYSCIA CILIARIS (*L.*). Amongst mosses on rocks thinly covered with earth. Ninghai. Fertile. A muscicole state with the laciniæ shorter and more contiguous.

5. PHYSCIA STELLARIS (*L.*). On trees, near the Pagoda; and on granite posts near Shanghai. Fertile.

6. PHYSCIA SETOSA (*Ach.*). On trees in plantations, fertile; and on bricks, sterile. Near Shanghai.

7. PHYSCIA ADGLUTINATA, *Floerke.* On bark of trees. Near Shanghai. Fertile.

8. PHYSCIA PICTA (*Sw.*). On trees between Shanghai and the Pagoda.

Forma SOREDIIFERA. On trees in plantations. Shanghai. Rarely fruiting, fide Maingay.

Tribe LECANOREI.

9. LECANORA (§ SQUAMARIA) SAXICOLA, *Poll.* On gravestones and on rocks. Near Shanghai.

10. LECANORA (§ SQUAMARIA) COCCOCARPIOPSIS, *Nyl.*, sp. n. Thallus albidus subopacus tenuis (crassit. 0·1–0·2 millim.), laciniato-lobatus, laciniis adnatis subradiantibus (latit. 1 millim. vel angustioribus), margine summo subreflexo; apothecia livido-rufescentia superficialia (latit. 0·5–0·9 millim.), margine thallino integro cincta; sporæ 8næ oblongo-ellipsoideæ, longit.

0·008–0·009 millim., crassit. 0·004–0·006 millim.; paraphyses gracilescentes. Iodo thecæ cærulescentes, dein vinose fulvescentes. Videtur *Squamaria*. Thallus K—, lobi apice rotundati.

On rocks. Hills near Ninghai. Very sparingly fertile.

11. LECANORA (§ PLACODIUM) CALLOPISMA, *Ach.* On rocks. Ninghai.

12. LECANORA CITRINA (*Ach.*). On mortar of walls. Near Shanghai.

13. LECANORA AURANTIACA (*Lightf.*). On trees. Near Ninghai. Sparingly fertile. An atypical state.

14. *LECANORA ERYTHRELLA, *Ach.* On granite rocks. Shanghai.

15. LECANORA VITELLINULA, *Nyl.* On brickwork and boulders. Shanghai.

16. LECANORA ERYSIBOPSIS, *Nyl.*, sp. n. Similis *Lecanoræ erysibæ*, sed mox differens gelatina hymeniali iodo cærulescente, cærulescentia persistente. Sporæ oblongæ vel ellipsoideæ, longit. 0·011–0·016 millim., crassit. 0·004–0·005 millim.—Thallus cinerascens tenuis subleprosus et subareolato-rimosus; apothecia subfusca (latit. circiter 0·5 millim.), subbiatorina.

On mortar of walls. Shanghai.

17. LECANORA COMPENDIOSA, *Nyl.*, sp. n. Thallus albidus subopacus lævis frustulosus turgidus (crassit. circiter 1 millim. vel tenuior), parce rhagadiose rimosus, frustulis variis (latit. 3–6 millim.) subcontiguis, ambitu obsolete lobatulo; apothecia carneo-rufescentia superficialia (latit. 1–2 millim.), margine thallino integro cincta; sporæ 8næ ellipsoideæ, longit. 0·010–0·011 millim., crassit. 0·006–0·009 millim.; paraphyses discretæ fere mediocres; epithecium inspersum. Iodo gelatina hymenialis cærulescens, dein vinose fulvescens.—Species incerti loci systematici in genere suo, nam spermogonia non visa sunt. Esse possit vicina *Lecanoræ galactinæ*. Thallus K—.

On rocks. Hills near Ninghai. Sparingly fertile. Associated with *L. coccocarpiopsis*.

18. LECANORA ACHROA. *Nyl.* On smooth bark of trees. Shanghai.

Var. PHÆACHROA, *Nyl.* Associated with the type.

19. LECANORA CARNULENTA, *Nyl.*, sp. n. Thallus albidus grosse granulatus vel varians granulis subcrenatis (crassit. circiter 0·5 millim.); apothecia carnea superficialia (latit. 1–2 millim.), margine thallino integro (subflexuoso) cincta; sporæ 8næ ob-

longæ, longit. 0·008–0·011 millim., crassit. 0·004 millim.; paraphyses gracilescentes; epithecium inspersum. Iodo gelatina hymenialis cærulescens (cærulescentia subpersistente).—Videtur species ex affinitate *Lecanoræ argopholis*. Thallus K flavescens.

On rocks near waterfall, Ninghai. Very sparingly, fide Maingay.

20. Lecanora cinerea (*Pers.*). On rocks. Hills near Ninghai. A decolorate state.

Tribe Lecideei.

21. Lecidea trachonopsis, *Nyl.*, sp. n. Thallus cinerascens tenuis inæqualis rimoso-diffractulus; apothecia nigra adnata convexula immarginata (latit. 0·3–0·5 millim.), variantia marginata, intus concoloria; sporæ 8næ incolores oblongæ 1–3-septatæ, longit. 0·009–0·015 millim., crassit. 0·003 millim.; paraphyses gracilescentes; epithecium vix vel vage et hypothecium crassum nigrescentia vel cærulescenti-nigrescentia. Iodo gelatina hymenialis cærulescens, cærulescentia persistente.—Species locum habens, ut videtur, prope *Lecideam trachonam* (Flot.). Hypothecium et epithecium acido nitrico rosellotincta. Spermatia arcuata, longit. 0·016–0·018 millim., crassit. 0·0005 millim., quod recedit a *L. trachona*.

On damp bricks. Shanghai.

22. Lecidea tritula, *Nyl.*, sp. n. Thallus albido-cinerascens tenuissimus vel evanescens; apothecia nigra plana marginatula minuta (latit. 0·25 millim.), intus concoloria; sporæ 8næ incolores ellipsoideæ simplices, longit. 0·010–0·012 millim., crassit. 0·006 millim.; paraphyses mediocres; epithecium et hypothecium fuscescentia. Iodo gelatina hymenialis cærulescens, dein violaceo-fulvescens (apice thecarum obscurius tincta).—Species versus *Lecideam mediocriculam* disponenda. Epithecium obscurius fuscescens quam hypothecium tenue (quod sæpe solum luteo-fuscescens).

On the bark of trees. Near Shanghai.

23. Lecidea subaromatica, *Nyl.*, sp. n. Thallus albidus, fere mediocris (crassit. circiter 0·5 millim.) inæqualis, rimoso-diffractus; apothecia nigra planiuscula subimmarginata, intus concoloria; sporæ 8næ incolores oblongæ vel oblongo-bacillares, 3-septatæ, longit. 0·018–0·024 millim., crassit. 0·004 millim.; paraphyses gracilescentes; epithecium nigrescens; hypothecium fuscum (vel superius rufescens). Iodo gelatina hyme-

nialis cærulescens, dein cærulescenti-obscurata.—Species forsitan e stirpe *Lecideæ aromaticæ*, sin potius accedat ad *Lecideam subincomptam*. Epithecium acido nitrico violaceo-tinctum.

On mortar upon the old ramparts of Shanghai.

24. LECIDEA ENTEROLEUCA, *Ach.* On the walls of Macao Fort, near Canton.

Tribe GRAPHIDEI.

25. GRAPHIS SCRIPTA, *Ach.* On decaying timber, Shanghai. On trees, Confucian-temple garden, Shanghai.

Var. RECTA (*Humb.*). On Peach-trees. Shanghai.

Var. PULVERULENTA (*Pers.*). On trees. Mandarin's garden, Kuhding, near Shanghai.

26. OPEGRAPHA SUBSIDERELLA, *Nyl.* On an aged Willow. Shanghai.

27. ARTHONIA CINNABARINA, var. ADSPERSA (*Mont.*). On Magnolia-trees. Shanghai.

28. LECANACTIS OBFIRMATA, *Nyl.*, sp. n. Thallus macula pallida indicatus; apothecia nigra superficialia firma rotundata aut immixta oblonga vel variantia subflexa (latit. 0·3–0·5 millim.), firme marginata, intus concoloria; sporæ 8næ fuscæ, oblongæ, submurali-divisæ (vel seriebus 8–10 transversis biloculosæ), longit. 0·027–0·030 millim., crassit. 0·009–0·011 millim. (iodo cærulescentes). — Comparanda cum *Lecanactine serograpta* (Spr.), Mont., quæ differt apotheciis suberumpentibus, tenuiter marginatis etc.

On trees. Confucian-temple garden, Shanghai. Very rare, fide Maingay. Only a single small specimen gathered.

29. GLYPHIS CICATRICOSA, *Ach.* On trees. Confucian temple, Shanghai.

30. GLYPHIS FAVULOSA, *Ach.* On trees. Confucian temple.

Tribe PYRENOCARPEI.

31. VERRUCARIA SANTENSIS, *Tuck.* On timber brought for sale from the interior to Shanghai.

32. VERRUCARIA NIGRESCENS, var. DEVIANS, *Nyl.* Differens thallo fusco, sporis minoribus (longit. 0·015–0·016 millim., crassit. 0·007–0·010 millim.). *V. nigrescens* var. *deparca*, Nyl., in Suecia, Gotlandia (lecta a Zetterstedt), differt thallo macro parum evoluto.

On rocks. Near Shanghai.

33. VERRUCARIA GLAUCINA, *Ach.* On mortar of walls. Shanghai.

34. VERRUCARIA PARIATA, *Nyl.*, sp. n. Thallus obscure olivaceo-nigrescens tenuis; apothecia pyrenio dimidiatim nigro (latit. 0·2–0·3 millim.) convexo; sporæ 8næ, fusiformes 5–7-septatæ, longit. 0·030–0·034 millim., crassit. 0·006 millim.—Affinis *Verrucariæ olivaceæ*, Borr., a qua mox distat sporis crassioribus (in *V. olivacea* ea sunt crassit. 0·0035–0·0045 millim.).

On Peach-trees. Shanghai.

35. VERRUCARIA NITIDA (*Schrad.*). On bark of trees. Shanghai.

IV. *Japan.*

Family EPHEBACEI.

Tribe BYSSACEI.

1. SCYTONEMA sp.? On moist rocks. Nagasaki. Sterile.

Family COLLEMACEI.

Tribe COLLEMEI.

2. LEPTOGIUM TREMELLOIDES (*L.*). On Pine-trees. Nagasaki. Sparingly fertile.

Family LICHENACEI.

Tribe STEREOCAULEI.

3. STEREOCAULON JAPPONICUM, *Fr. fil.* On rocks. Nagasaki. Sparingly fertile.

Tribe CLADONIEI.

4. CLADONIA DECORTICATA, *Floerke.* On the ground. Nagasaki. Only spermogoniiferous.

Tribe RAMALINEI.

5. RAMALINA FARINACEA (*L.*). On trees. Yokohama. Very sparingly fertile.

Tribe PARMELIEI.

6. PARMELIA TINCTORUM, *Desfr.* On trunks of trees and on rocks. Yokohama. Sterile.

7. PARMELIA CONSPERSA (*Ehrh.*). On rocks. Nagasaki. Sterile.

Forma ISIDIATA, *Anzi.* Along with the type, and sparingly fertile.

8. PARMELIA SUBCONSPERSA, *Nyl.* On maritime rocks. Nagasaki. Sparingly fertile. A larger and a smaller state.

Tribe PHYSCIEI.

9. PHYSCIA SPECIOSA, *Wulf.* On Fir trees in the glens, near Nagasaki. Sparingly fertile. Also an isidiiferous condition.

10. PHYSCIA PICTA (*Sw.*). On trees. Nagasaki.

Tribe LECANOREI.

11. *LECANORA ERYTHRELLA, *Ach.* On rocks. Nagasaki.

12. LECANORA SUBGANGALIZA, *Nyl.*, sp. n. Thallus albidus lævigatus, satis tenuis (crassit. circiter 0·5 millim.), rimoso-diffractus; apothecia nigra innata nuda margine thallino distincto, intus pallida; sporæ 8næ ellipsoideæ, longit. 0·009–0·012 millim., crassit. 0·005–0·006 millim.; paraphyses gracilescentes; epithecium cærulescenti sordide tinctum. Iodo gelatina hymenialis cærulescens, cærulescentia persistente.—Affinis et subsimilis *Lecanoræ gangalizæ*, Nyl., sed sporis nonnihil minoribus et reactione iodo effecta gelatinæ hymenialis alia. Thallus K flavens. Spermogonia non visa.

On rocks. Nagasaki.

13. LECANORA ATRA, *Ach.* On walls. Nagasaki.

Tribe THELOTREMEI.

14. URCEOLARIA GYPSACEA, *Ach.* On marl. Nagasaki.

Tribe LECIDEEI.

15. COCCOCARPIA MOLYBDÆA, *Pers.* On old trunks. Nagasaki. Sterile and atypical,=f. VEGETIOR, "lobes broader, firmer."

16. LECIDEA MAINGAYENSIS, *Cromb.*, sp. n. Thallus pallide luridus tenuis granulato-concrescens; apothecia rufa convexa immarginata (latit. 0·3–0·4 millim.), sæpe aggregata; sporæ 8næ oblongæ simplices, longit. 0·009–0·012 millim.; paraphyses non bene discretæ; epithecium incolor; hypothecium sublutescens. Iodo gelatina hymenialis cærulescens, dein subfulvescens. —Est e stirpe *Lecideæ vernalis* vel *parvifoliæ* species notis allatis dignoscenda.

On stumps of old Firs. Nagasaki.

17. LECIDEA ENTEROLEUCA, *Ach.*, *Nyl.* On rocks. Nagasaki.

18. LECIDEA ENTEROLEUCELLA, *Nyl.*, sp. n. Thallus albidus tenuis conferte rimulosus; apothecia nigra planiuscula subimmarginata (latit. circiter 0·25 millim.), intus albida; sporæ 8næ incolores ellipsoideæ, longit. 0·011–0·012 millim., crassit. 0·005–0·006 millim.; epithecium subnigrescens; paraphyses me-

diocres discretæ; hypothecium incolor. Iodo gelatina hymenialis bene cærulescens, dein obscurata (thecæ præsertim tinctæ).—Affinis *Lecideæ enteroleucæ*, Ach., jam vero minutie apotheciorum distincta. Epithecium acido nitrico rosello-tinctum. Spermatia arcuata, longit. 0·016–0·022 millim., crassit. 0·0005 millim.

On rocks. Nagasaki.

19. LECIDEA ALBUGINOSA, *Nyl. in Flora*, 1877, p. 227 (?) On rocks in the bed of a rivulet. Nagasaki.

The spores are not rightly evolute; but in general features as well as in habitat the specimens seem to agree with this species.

20. LECIDEA PREMNEA, *Ach.* On trees. Nagasaki. Common, fide Maingay.

21. LECIDEA STELLULATA, *Tayl.* On rocks. Nagasaki.

Tribe GRAPHIDEI.

22. GRAPHIS SCRIPTA, *Ach.* On smooth bark and on branches of trees. Yokohama.

Var. SERPENTINA (*Pers.*). On Mulberry-trees. Yokohama.

23. GRAPHIS INUSTA, *Ach.* On branches of trees. Yokohama.

24. ARTHONIA PUNCTIFORMIS, *Ach.* On thin bark. Nagasaki.

Tribe PYRENOCARPEI.

25. VERRUCARIA CONCATERVATA, *Nyl.*, sp. n. Thallus vix ullus; apothecia catervatim subtrypetheliiformia, innata, erumpentia, demum convexe prominula (latit. 0·2–0·4 millim.), pyrenio integre nigro; sporæ 8næ incolores oblongæ vel oviformes, 10-loculares, longit. 0·040–0·052 millim., crassit. 0·012–0·015 millim.—Accedens ad *Verrucariam catervariam*, sed facie alia, apotheciis minus obductis. In *V. pleiomera*, Nyl., sporæ subsimiles, at apothecia non catervaria. Pyrenia latit. 0·3–0·4 millim.

On bark of trees. Yokohama.

26. VERRUCARIA PORINOPSIS, *Nyl.* sp. n. Thallus albidus vel albido-subcinerascens tenuis continuus, papillis isidiosis exasperatus; apothecia in papillis mastoideis (latit. 0·4 millim.), pertusarioideis, monohymeneis innata, incoloria (pallida); sporæ 8næ incolores, ellipsoideæ, fere pertusariæmorphæ, longit. 0·048–0·055 millim., crassit. 0·024–0·027 millim.; paraphyses graciles Iodo gelatina hymenialis vinose fulvo-rubescens.—Species

omnino propriæ stirpis inter *Verrucarias*, sporis simplicibus, paraphysibus facieque pertusarioidea. Thallus gonidiosus.

On Pine trees. Above Nagasaki.

27. VERRUCARIA NITIDA (*Schrad.*). On bark of trees. Yokohama.
28. TRYPETHELIUM SPRENGELII (*Ach.*). On bark of trees. Nagasaki.

Notes on certain Plants of North-western Queensland possessing valuable Medicinal Properties. By WILLIAM E. ARMIT, F.L.S., F.R.G.S.

[Read November 2, 1882.—Abstract.]

AN intimate acquaintance with the habits and customs of our aborigines led me some years ago to attach considerable importance to the study of the plants in use among them for medicinal purposes. My subordinates were of great assistance to me in procuring plants, roots, and flowers which they averred were specifics in several forms of disease; but I found that in very many cases *faith alone* was the curative agent, as the remedy, when exhibited to a European, failed to exert any beneficial change whatever.

I found it extremely difficult to sift the evidence adduced in support of these statements, there being generally so much concomitant superstition mixed up with the truth. Some plants, for instance, only retained their healing properties during the first week of the new moon. Others, again, were to be used at the full or last quarter. More could only be brought into requisition when growing in certain localities, as under rocks, on the summit of mountains, near a waterfall, or in a swamp.

About this time I was astonished to find a native woman drying a quantity of *Aristolochia* which grew abundantly under the granite rocks near Dunrobin. This, she informed me, was useful in midwifery.

The women of Yule Island use an indigenous plant—a species of *Croton*, I believe—for the purpose of procuring abortion; but I have not met with the custom in Queensland in this shape.

In the wet season of 1877–78 the patrol on the Einasleigh river was constantly wet through, and spent a most miserable month swimming creeks and rivers, lying on wet ground, and subsisting on half-cooked victuals, whenever we were fortunate enough to shoot a kangaroo or catch some fish. As a consequence fever and ague soon put in an appearance, rapidly followed by dysentery. I was fortunate in escaping both; but several troopers succumbed, and I found it difficult to proceed.

My corporal told me that quinine was useless, and offered to show me a "bujdgeree" (splendid) plant which would stop the dysentery at once. He did so; and it proved to be the common *Grewia polygama*, Roxb., the seeds of which Leichardt mentions as producing a subacid drink when boiled.

Collecting a quantity of the leaves, I returned to camp, and gave each of my patients about an ounce of the liquid decoction, which was of a pale sherry-colour. I repeated the dose every four hours throughout the night; and the sixth dose completed a radical cure.

Since then I have tried this remedy in scores of cases; *and I have never known it to fail in any case, however serious.* I have made it a rule to inform the carriers and travellers I meet of the sure cure they have always at hand, in case it may be required; and all are unanimous in extolling its truly magical properties.

The importance of possessing a specific against the most insidious disease to which Europeans are subject in tropical countries cannot be underrated; and as the plant grows abundantly throughout N.E. and N.W. Queensland, it comes within the reach of all.

It would be interesting to introduce it into general practice, and thus test its value either in extract, tincture, powder, or decoction. It is so plentiful—a very weed, in fact—that large quantities could easily be procured for experimental purposes; and I shall be most happy to forward a supply of the dried plants to any gentleman wishing to test its efficacy.

My next discovery was due to a miner who had poisoned his hand while at work in a claim on the Etheridge Gold-fields. An ugly ulcer had formed on the knuckle of the third finger of his right hand; and it resisted every attempt he made to heal it. At last he came to me; and I prescribed iodide of potassium, a charcoal poultice, and total abstinence.

One of my men brought me a branch of *Careya arborea*, Roxb. He proceeded at once to make a pulp of a quantity of the leaves, which I placed on the ulcer, forcing the pulp well into its cavity. This poultice was renewed four times per diem; and in five days the ulcer had disappeared. I have tried this form of poultice several times since, and ever with the same result. As this small tree occurs in very many places throughout the colony, its properties are well worthy of being made public.

Erythræa australis, R. Br., I have found of use as a tonic in febrile complaints.

Petalostigma quadriloculare, F. von Muell., is a useful remedy in fever, low or intermittent, ten-grain doses of the dried bark three times per diem often producing a favourable result. The ripe fruit, which is of a most intense bitterness, is a valuable vermifuge in horses. I have used it repeatedly, and with success, in my stud.

Andropogon citreus, R. Br., makes a useful tea in fevers. I found it growing at the native wells—the easternmost source of the Burdekin river—situate on the telegraph-line between Cashmere and Junction Creek. I know of two plants used by the aborigines for syphilitic disease; but I have not been enabled to test their efficacy to my satisfaction; hence I refrain from recording them. No doubt many more valuable plants exist, and only require patience and intelligent research to test their value. Only a few months ago the *Euphorbia pilulifera*, L., was a common weed, uncared for by any one. Now it is largely used by nearly all who suffer from asthma.

Datura alba, Nees, a most poisonous plant, which grows on nearly all our northern rivers, proves fatal to numbers of horses and cattle every year. This plant is also valuable in asthma, but leaves a sensation of nausea and headache which is very distressing.

The aborigines use several species of Malvaceous shrubs, obtaining a mucilaginous drink which proves beneficial in many cases. Roots are also used in this manner, being roasted, then pounded, and the mucilage sucked out of them. They have a rough method of obtaining the starch from seeds, roots, and bulbs, which they accomplish by pounding and trituration, allowing the starch-grains to settle on the bottom of a large "cooloomen," or canoe-shaped basin. The water is then poured off, leaving a thick cake of hard starch which is baked into cakes. It resembles our arrowroot or corn-flour in substance, and is not at all unpalatable.

Discovery of Tasmanian Plants near Adelaide, South Australia.

By J. G. Otto Tepper, F.L.S.

[Read December 7, 1882.]

In the early part of January 1882 I received an invitation from Prof. R. Tate to join in an excursion for the purpose of botanically examining a locality that had not been before visited, a request to which I cheerfully acceded; and the following pages represent our joint results.

This locality is situated some 40 miles south of Adelaide, among the low ranges covering the county of Hindmarsh (which forms a peninsula extending towards Kangaroo Island), and is almost in its centre.

Starting from Willunga (30 miles S. of Adelaide), which Prof. Tate determined to be about 400 feet above sea-level, we crossed the Sellick's-Hill range, consisting of blue talcose shales and quartzites at a very high angle of elevation, and found the summit of the pass about 950 feet, the highest parts of the ridge rising perhaps 100–200 feet higher. The more elevated portion was covered by stringy-bark Eucalypts (*Eucalyptus obliqua*) and shrubs &c. similar to those about the capital.

From here (2 miles E. of Willunga) the road descended gradually to the bed of the Meadows Creek, a watercourse of some length; but at this locality and time it did not show the least sign of water, or that a considerable body of water ever passed. This being undoubtedly the case higher up, as we found subsequently by unmistakable signs, it must be inferred that the water finds its way under ground for some distance through the gravel and sand with which the valley is filled to an unknown depth.

At a distance of 5–6 miles another ridge was crossed, evidently the watershed between St. Vincent's Gulf and Encounter Bay with the Murray and its lakes. The road downwards on the E. decline followed the windings of a marshy rivulet with permanent fresh water, and scores of tiny springs oozing out into the drain alongside the road. The lower parts of the hillsides consisted of sands mixed with beautifully rounded pebbles of quartzite &c., presumably of Tertiary age. The vegetation here changed almost immediately, and almost at every step we met with plants rarely, or not at all, occurring nearer Adelaide. Thus *Banksia* *ornata*, *Adenanthus* sp., *Drosera binata*, *Xyris operculata* were observed, the two latter in full bloom. At about 9 or 10 miles from our starting-point, we arrived at our destination, a level marshy flat surrounded by weird-looking hills on all sides and a square mile or two in extent. The locality is uninhabited, and known locally by the term "Square Waterhole." About 1½ mile S.E. rises a steep hill, its summit formed by bare white rocks, from which it has received the name Mount Jagged.

After arranging our camp we began collecting, and found this marsh to be as fine a representation of a South-Australian moor as could well be imagined. Consisting of black mould spread over fine white sand, as exhibited by some drains, it was densely overgrown by *Sprengelia incarnata*, *Leptospermum lanigerum*, and *Melaleuca squamea* in dense clumps, numerous Cyperaceæ and Juncaceæ intermixed with *Utricularia dichotoma* in thousands; while *Lycopodium laterale*, *Schizæa bifida*, and *Lindsaya linearis* overspread the less grassy spots. *Calostrophus lateriflorus* and *Patersonia longiscapa* were very abundant in the very moist spots. *Patersonia glauca*, on the contrary, occupied drier spots along the margin. We were surprised to find many plants in full bloom, while at this late date scarcely any could be found in drier places, or had long passed it there.

Owing to the exceptionally dry season the marsh was dry enough to allow us to cross it with care, after we had examined part of its S.W. edge, where we found several strong springs. Following a drain, &c., we succeeded without much ill adventure in getting to the outlet on the N.E. side. What rather surprised us was, that at several places all appearance of water vanished, and some 100 yards further on the murmuring of a strong stream among dense bushes became audible; this occurred repeatedly, even in the narrow bed of the gully, through which the waters escaped towards the N.E. The lower hills surrounding the marsh consisted of Tertiary gravels and clays, the former exhibiting numerous symmetrically rounded and polished pebbles of older rocks in all sizes, but no fossils.

Next day the hills to the south and Mount Jagged were examined; the latter was found by Prof. Tate to be about 1465 feet high, the edge of the Miocene about 2200 feet and that of the flat itself about 880 feet above the sea. The summit of Mount Jagged consists of snow-white fine-grained quartzite of pre-Silurian age, the angle of dip being about or near 90°, with a strike nearly N.–S. It is overgrown with low *Eucalypti* (sp. indeterminable), *Casuarina distyla*, and very dwarfish *Banksia marginata*, scarcely one of the latter being above 2 feet high, many less. Among the rocks at the summit we found *Marianthus bignoniaceus*, which near Adelaide is only observed in moist springy gullies. *Eucalyptus obliqua* forms open groups of forest on some of the other hills adjoining Mount Jagged. On a sandy hillside near its foot we found the curious *Caustis pentandra* sparingly among open scrub. Some 93 species of plants were collected by us during our short stay of less than two days, of which my specimens were, after our return, submitted to Baron F. v. Mueller, who determined them most courteously for me, the accompanying list presenting the result. Those marked by an asterisk are new to the province. Others were found N. from the Willunga road, where a succession of fine water-holes occurs, but no flowing water, accompanied by a much different vegetation. This locality has never before been examined at this season.

The most important result obtained is, that among the plants collected at the Square Waterhole were 12 species new for this province, and hitherto only found in Tasmania. Ten of these belong to genera already represented here; but 2 genera, viz. *Micrantheum hexandrum* and *Caustis pentandra*, are also new. Meadows Creek, where I personally collected only thirteen species, added two more Tasmanian plants, viz. *Hibbertia hirsuta* and *Carex inversa*. Thus another point has been established elucidating the distribution of Australian plants, Prof. Tate having found several, inclusive of *Micrantheum hexandrum* and *Caustis pentandra*, lately at Kangaroo Island.

The locality which was examined at Meadows Creek is a long valley, and from about a quarter of a mile to a mile wide, perfectly level, on the western side of which the imperfectly defined watercourse is situated, chiefly marked by a chain of larger and smaller holes containing permanent fresh water. Large Red-gum trees (*Eucalyptus rostrata*) accompany them, replaced higher up on the hill-slopes by *E. leucoxylon* and *E. obliqua.* The flat is covered a short distance from the bed with very dense clumps of *Banksia marginata*, underneath which a dense covering is noted of *Calastrophus* (*fastigiatus* ?), *Lepidosperma laterale*, and, near the water, large tussocks of *Poa cæspitosa*, within which *Carex inversa* was found exclusively. Very close to the banks, on permanently moist ground, occurs in small patches the *Cynodon* sp. (No. 100), which

I have seen rarely in flower, and then, as in the specimen sent, only with two or three spikes; while *Cynodon Dactylon* exhibits five, blooming annually and profusely along roads and dry hill-sides. *Acacia* (*retinodes*?) grows in large globular shrubs along the banks; and some bushes were observed with copious flowers and ripe fruit.

Although not botanical, I may mention that while disturbing a large *Poa* tussock, one of the little Kangaroo-mice leaped out and was captured alive. It was a little creature, not more than about 2 inches in length of body, with a tail about 2½ to 3 inches, and reddish-brown colour.

On the whole, the vegetation was found almost wholly distinct from that of Square Waterhole, and very similar to scenery further north.

Appended is the list of the plants collected, or which could be identified with certainty, exclusive of such as form a feature almost everywhere.

List of Plants collected at Square Waterhole, Mount Jagged, Co. Hindmarsh, South Australia, 6–7*th Jan.* 1882, *as identified by Baron Ferd. v. Mueller.*

PITTOSPOREÆ.

BURSARIA SPINOSA, *Cav.* Hills and drier parts of marsh; commencing to flower.

MARIANTHUS BIGNONIACEUS, *F. v. Muell.* On the summit of Mt. Jagged and adjoining hills, among quartzite rocks. Near Adelaide it occurs only near the bottom of moist dells.

POLYGALEÆ.

CAMESPERMA CALYMEGA, *Labill.* Dry hills; only in bud.

HYPERICINEÆ.

HYPERICUM JAPONICUM, *Thunb.* Hills and marsh; flowers only about half as large as those near Adelaide.

RUTACEÆ.

ZIERIA VERONICA, *F. v. Muell.* Small, erect shrub, 6–9 in. high. Neither flower nor fruit; leaves very strongly scented when bruised. On dry hill-side.

RHAMNACEÆ.

*SPYRIDIUM GUNNII, *Benth.* (somewhat doubtful sp.). Tasmanian type. Species new for South Australia. Low shrubs on hills and dry flats; in bud only.

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* The plants marked in the list with an asterisk are new to the Province.

CRYPTANDRA HISPIDULA, *Reisseck.* Very small shrubs on gravelly, dry hills; rather numerous; in flower.

LEGUMINOSÆ.

GOMPHOLOBIUM MINUS, *Smith.* Dry, rocky hill-sides; in full bloom and fruit; 3-6 inches; rather abundant.

PHYLLOTA PLEURANDROIDES, *F. v. Muell.* Shrubs; rare, around edge of swamp, on drier sandy soil; in bloom.

PULTENÆA VILLIFERA, *Sieber.* As the preceding.

PULTENÆA CANALICULATA, *F. v. Muell.* Spreading shrubs along edge of swamp, with cylindrical fleshy leaves. As the species of this name is well known to me elsewhere, but without the above character, and only flowers were here obtained, there is some doubt in respect of the identification.

PULTENÆA, sp., No. 29. Small straggling shrubs in moist spots, with short linear leaves, very scanty yellow flowers, mostly apical, and very slender stem and branches. No fruit was obtainable.

ACACIA RETINODES, *Schlechtendal.* Small trees and shrubs along water-courses; in flower only, no fruit seen. Differing sensibly in appearances from the species as found at Meadows Creek, but similar in form to Onkaparinga type.

DROSERACEÆ.

DROSERA BINATA, *Labill.* Occurring numerously in the marsh and tributary water-courses wherever very moist; in full bloom, 6–10 in.

HALORAGEÆ.

HALORAGIS MICRANTHA, *R. Br.* In marsh; numerous.

HALORAGIS TEUCROIDES, *DC.* Under trees and shrubs on dry hill-sides.

*MYRIOPHYLLUM AMPHIBIUM, *Labill.* Tasmanian type. Species new for South Australia; also occurring in the Onkaparinga river near Clarendon, as found by writer. It grows on mud left by the retreating water, germinating in December, and flowering in January and later.

MYRTACEÆ.

*BAECKIA DIFFUSA, *Sieber.* Tasmanian type. Species new for

South Australia. In dale at foot of hills and swampy in winter. Minute shrub, always under shelter and hidden by *Hibbertia* shrubs. Very rare; and in flower only.

LEPTOSPERMUM LANIGERUM, *Aiton.* Small-leaved variety; forming dense thickets near the flowing or stagnant water; flowering profusely.

MELALEUCA DECUSSATA, *F. v. Muell.* Near foot of hills and dry spots in swamp; dwarf form, from 3 inches to about 18; no larger were seen; rather rare here. Numerous and large, 5–6 feet, nearer Adelaide, along rivers.

MELALEUCA SQUAMEA, *Labill.* Rigid upright shrubs, forming dense thicket in moist parts of swamp; 2–4 feet high.

EUCALYPTUS OBLIQUA, *L'Héritier.* Summits of hills.

EUCALYPTUS COSMAPHYLLA, *F. v. Muell.* Dry hill-sides; low shrubs.

LYTHRACEÆ.

LYTHRUM THYMIFOLIUM, *L.* Around edge of marsh.

ONAGRACEÆ.

EPILOBIUM TETRAGONUM, *L.*, var. PALLIDIFLORUM. In very moist swampy creek; in flower.

UMBELLIFERÆ.

HYDROCOTYLE HIRTA, *R. Br.* Numerous on banks of earth in swamp.

XANTHOSIA DISSECTA, *Hook. f.* On stony and sandy dry hill-sides; in bloom.

RUBIACEÆ.

OPERCULARIA VARIA, *R. Br.* With the preceding; in fruit.

COMPOSITÆ.

CENTIPEDA (§ MYRIOGYNE) CUNNINGHAMI, *F. v. Muell.* Numerous in swamp.

HELICHRYSUM OBTUSIFOLIUM, *Muell. & Sander.* Dry gravelly hills; a few still in flower.

HELICHRYSUM BLUNDOWSKIANUM, *Steetz.* Associated with *Banksia armata*; in flower.

HELICHRYSUM SEMIPAPPOSUM, *DC.* Hills, among shrubs; rather scarce; in flower.

ERECHTHITES ARGUTA, *DC.* In a very moist creek; rare.

STYLIDIEÆ.

STYLIDIUM GRAMINIFOLIUM, *Sw.* Very numerous and luxuriant in swamp, and in full bloom, while elsewhere long ago past it.

GOODENOVIEÆ.

GOODENIA GENICULATA, *R. Br.*, var. LANATA. On dry and rocky hill-sides; 1–2 in. in size.

SCÆVOLA ÆMULA, *R. Br.* Among Cyperaceæ in forest on summit of hills; rare; in flower.

CAMPANULACEÆ.

LOBELIA MICROSPERMA, *F. v. Muell.* Dry hill-sides; in bud.

LOBELIA ANCEPS, *Thunb.* Everywhere in swamp, where dry.

LOBELIA PEDUNCULATA, *R. Br.* On edge of water, not common.

EPACRIDEÆ.

STYPHELIA HUMIFUSA, *Labill.*, var. DENTICULATA, *F. v. Muell.* On dry hill-sides, just beginning to flower. I think this "var." is entitled to rank as a species.

STYPHELIA CONCURVA, *F. v. Muell.* Only among quartzite rocks near summit of hills; a few yet in flow er.

ACROTRICHE SERRULATA, *R. Br.* On dry hill-sides; in bud.

*BRACHYLOMA CILIATUM, *Benth.* Tasmanian type; species new for South Australia. Low shrub, 6–9 in.; rare on dry stony hills; beginning to flower.

SPRENGELIA INCARNATA, *Smith.* Forming dense thickets in moister parts of swamp; 2–3 feet high; in flower and ripe fruit.

SCROPHULARIACEÆ.

EUPHRASIA BROWNII, *F. v. Muell.* On dry hill-sides, very dwarf. The form in the marsh much larger, a few specimens still flowering, most in fruit; the flower of latter white outside, interior nearly all yellow, which is not the case where occurring in scrub and had not been observed before by me.

LENTIBULARIACEÆ.

UTRICULARIA DICHOTOMA, *Labill.* Very numerous in swamp and in full bloom; 2–9 in. high; flower purple, but some were seen perfectly white.

POLYGONACEÆ.

POLYGONUM MINUS, *Hudson.* In dense thickets of *Melaleuca* &c., in very moist marshy rivulet; rare.

PROTEACEÆ.

ADENANTHUS TERMINALIS, *R. Br.* No specimen brought home; thus the species is doubtful, as the plant usually is prostrate, but the form noticed here grows *upright*, with the branches in whorls almost at right angles to stem; height 1–3 feet, on dry and rocky hills; no prostrate form was seen. In flower.

PERSOONIA JUNIPERINA, *Labill.* On dry and stony hill-sides; in full flower.

HAKEA ROSTRATA, *F. v. Muell.* Plentiful in swamp and on hill-sides.

BANKSIA MARGINATA, *Cav.* Dwarf form, from 1–3 feet high only; on rocky hill-sides.

BANKSIA ORNATA, *F. v. Muell.* Sandy moist rises near the edge of marsh. It occurs only on Tertiary sands and gravels, and is very local, but then gregarious.

EUPHORBIACEÆ.

*MICRANTHEUM HEXANDRUM, *Hook. f.* Originally known only from Tasmania; and the genus is new for South Australia. On dry gravelly hills; in fruit only. Small shrub, 3–4 inches high.

PARANTHERA ERICOIDES, *Klotzsch.* At same locality as the preceding, 6–12 in. high. Few plants in bloom, most in fruit only.

*BARONIA PARVIFLORA, *Smith.* Tasmanian plant; species new to South Australia. On edge of marsh; low shrubby plant, 4–6 in. high; under other shrubs; not abundant.

CORREA SPECIOSA, *Andrews.* Low shrub. Variety with rather fleshy leaves, very hairy and dark brown on the underside. No flowers or fruit noticed.

MONOCOTYLEDONES.

ORCHIDEÆ.

PRASOPHYLLUM PATENS, *R. Br.* Numerously in flower in swamp, while elsewhere it had disappeared long before.

IRIDIEÆ.

PATERSONIA GLAUCA, *R. Br.* On dry sandy rises around edge of swamp; numerous there; only in fruit; leaves cylindrical.

PATERSONIA LONGISCAPA, *Sweet.* Dwarf variety. In wet parts of swamp; numerous; in flower and fruit.

LILIACEÆ.

THYSANOTUS DICHOTOMUS, *R. Br.* On hill-sides under shrubs; in full bloom, or fruiting.

TRICORYNE ELATIOR, *R. Br.* In sandy dry localities; flowers much smaller than those seen before.

XYRIDIEÆ.

XYRIS OPERCULATA, *Labill.* Numerous in swamp where very wet; 2–3 feet high; in full bloom.

JUNCACEÆ.

JUNCUS PLANIFOLIUS, *R. Br.*
JUNCUS CÆSPITOSUS, *E. Meyer.*
JUNCUS BUFONIUS, *L.*, and a variety.
All in the moister parts of the swamp.

NAIADEÆ.

TRIGLOCHIN STRIATA, *Ruiz & Pavon.* Rare; along edge of drain.

CENTROLEPIDEÆ.

CENTROLEPIS FASCICULARIS, *Labill.* Along edge of drains; scarce.

RESTIACEÆ.

CALASTROPHUS (§ HYPOLÆNA) FASTIGIATUS, *F. v. Muell.* Around edge of swamp.

*CALOSTROPHUS LATERIFLORUS, *F. v. Muell.* Tasmanian type. Species new for South Australia. Gregarious in moister parts of swamp; 1–3 feet high.

CYPERACEÆ.

*CYPERUS GRACILIS, *R. Br.* Tasmanian type. Species new for South Australia. Rather scarce, along drains; a very pretty little plant, 2–3 in. high.

SCIRPUS INUNDATUS, *Spreng.* var.

*SCHŒNUS TENUISSIMUS, *Hook. f.* Tasmanian type. Species new for South Australia. Rare, in drier parts of the swamp.

CLADIUM GLOMERATUM, *R. Br.*

CLADIUM TETRAQUETRUM, *Hook. f.*

*CLADIUM SCHŒNOIDES, *R. Br.* Tasmanian type; species new for South Australia. Numerous in drier patches in and close around swamp.

CLADIUM JUNCEUM, *R. Br.*

*CAUSTIS PENTANDRA, *R. Br.* Tasmanian type. Genus new for South Australia. On sandy dry hill-side among shrubs in single plants; rather scarce, 1–1½ feet high; in fruit.

GRAMINEÆ.

ERAGROSTIS BROWNII, *Kunth.*

AGROSTIS QUADRISETA, *R. Br.*

POA CÆSPITOSA, *Forster*, var.

All in and around swamp where rather dry.

ACOTYLEDONES.

LYCOPODIACEÆ.

*LYCOPODIUM LATERALE, *R. Br.* Tasmanian type. Species new for South Australia. Numerous in moist parts of swamp; 1–10 in. high; in fruit.

FILICES.

SCHIZÆA BIFIDA, *Swartz.*

LINDSAYA LINEARIS, *Swartz.*

Both numerously associated with the *Lycopodium* and *Utricularia.*

PTERIS AQUILINA, *L.* Hill-sides in patches.

LOMARIA CAPENSIS, *Willdenow.* Along a creek escaping from swamp.

ASPLENIUM FLABELLIFOLIUM, *Cav.* Near edge of swamp and creeks.

Meadows Creek, January 1882.

*HIBBERTIA HIRSUTA, *Benth.* Tasmanian type. Species new for South Australia. Small prostrate shrub on flat, under *Banksia*-trees; only seen in fruit; rare.

MYRIOPHYLLUM VARIIFOLIUM, *Hook. f.*; CALLISTEMON COCCINEUS, *F. v. Muell.*; HYDROCOTYLE ASIATICA, *L.*; ERYNGIUM VESICULOSUM, *Labill.*; POTAMOGETON, sp. (probably *P. natans*); JUNCUS PAUCIFLORUS, *R. Br.*; CENTROLEPIS ARISTATA, *Roem. & Schultes*; and LEPIDOSPERMA LATERALE, *R. Br.*, var. *linearis.*

*CAREX INVERSA, *R. Br.* Tasmanian type; species new for South Australia. In flower and fruit; rare.

CYNODON, sp. (*Dactylon*, Richard? var.?), and SELAGINELLA PREISSIANA, *Spring*. Rare.

The following plants, not included in the list, were reserved for further examination &c. by Baron F. von Mueller, viz.:—*Cladium* sp., no. 80; *Carex* sp., no. 93 (meadows); *Xerotes* sp., no. 77; *Chara* sp., no. 95; *Tremella* sp., no. 102 (meadows); and *Hypnum* sp., no. 32.

Additions to the Lichens of the 'Challenger' Expedition.

By the Rev. J. M. CROMBIE, F.L.S.

[Read December 21, 1882.]

THE following Lichens from different localities visited by the 'Challenger,' which were inadvertently placed in the packets containing Mosses &c., have to be added to those previously enumerated by me in Linn. Soc. Journ., Bot. vol. xvi. pp. 211–231.

Teneriffe.

1. STEREOCAULON SPHÆROPHOROIDES, *Tuck.* On volcanic rocks. Well fertile.
2. CLADONIA PYXIDATA, var. CHLOROPHÆA, *Floerke.* On the ground amongst mosses. Sterile.
3. USNEA FLORIDA (*L.*). On small branches of trees. Sterile.
4. PARMELIA PERLATA (*L.*). On decayed branches of trees. Sterile.
5. PARMELIA PERLATA, var. CILIATA (*Schær.*). Amongst mosses on rocks. Sterile.
6. LOBARIA PULMONARIA (*L.*). On trees. Sterile.
7. PELTIGERA CANINA, var. MEMBRANACEA (*Ach.*). On the ground amongst mosses. Fertile.
8. PELTIGERA RUFESCENS, *Hoffm.* On the ground amongst mosses. Fertile.
9. NEPHROMIUM LÆVIGATUM (*Ach.*). On trunks of trees. Fertile.

10. PHYSCIA LEUCOMELA, var. ANGUSTIFOLA, *Mey. & Flot.* On rocks. Sterile.

Bermuda.

1. *CLADONIA PUNGENS (*Floerke*). On the ground. Sterile.

Island of Ascension.

1. PHYSCIA FLAVICANS (*Sw.*). On rocks. Sterile.
2. PHYSCIA LEUCOMELA, var. ANGUSTIFOLIA, *Mey. & Flot.* On the ground amongst rocks. Sterile.

Patagonia.

1. CLADINA SYLVATICA, var. PYCNOCLADA (*Pers.*). On the ground. Otway Harbour. Sterile.
2. STICTA URVILLEI, var. ORYGMÆOIDES, *Nyl.* On trunks of trees. Otway Harbour. Fertile.

Philippine Islands.

1. LEPTOGIUM TREMELLOIDES (*L.*). On trees. Malanipa Island. Fertile.
2. ASCIDIUM MONOBACTRIUM, *Nyl.* On thin bark. Malanipa.
3. LECIDEA MOSELEYI, *Cromb.*, sp. n. Thallus cinerascens, tenuis, rugulosus, continuus; apothecia nigra, superficialia (latit. 1–2 millim.), immarginata, sæpe subplacoide, obsolete radiatim insculpta, intus obscura; sporæ 8næ, incolores, fusiformes, 3-septatæ, longit. circiter 0·026 millim., crassit. 0·007 millim.; epithecium lutescens; hypothecium luteo-fuscescens. Iodo gelatina hymenialis cærulescens, dein fulvescens.—Species distincta e stirpe *Lecideæ premneæ.*

On the ground. Camigain Island.

4. GRAPHIS AFZELII, *Ach.* On branches. Malanipa.
5. GRAPHIS SCRIPTA, f. PULVERULENTA, *Ach.* On thin bark. Malanipa.
6. VERRUCARIA HETEROCHROA, *Mont.* On trunks of trees. Malanipa.
7. TRYPETHELIUM SPRENGELII, *Ach.* On bark. Malanipa.

Remarkable Malformation of the Leaves of *Beyeria opaca*, F. v. Muell., var. *linearis* (Bentham, Flora Austr. vi. 65). By J. G. Otto Tepper, F.L.S.

[Read November 2, 1882.]

(Plate XXI.)

Not having met with any description of the remarkable shapes into which the narrow linear leaves of the plant are transformed, of which the accompanying figures will give a faithful idea, and at a time when few observers are in the field it is hoped that the following notes will be of interest.

The typical form of *Beyeria opaca*, F. v. Muell. (Euphorbiaceæ), is found in a narrow belt along the eastern coast of St. Vincent's Gulf, as a low spreading shrub 1½–3 feet high, seldom or never occurring away from the direct influence of the sea-breeze. Its leaves are narrow, and scarcely above half an inch in length. The flowers appear in May and June, and are very numerous. On the opposite shore, along the coast of Yorke's Peninsula, it occurs likewise in like character at the lower levels; but further from the sea, near the summits of the low hills, its place is taken by a species or variety closely resembling in habit &c., if not identical with, the much taller *B. viscosa*, attaining a height of 5–6 feet.

Neither of the above two species has been noticed by the writer on the banks of the Onkaparinga river (which, rising eastward of Adelaide in the Mount-Lofty range, falls into St. Vincent's Gulf about 16 miles south of Adelaide); but a near relation, *B. opaca*, F. v. Muell., var. *linearis*, occurs among the vegetation lining the watercourse. In appearance it is quite distinct from the first two named, and apparently does not occur intermixed with them. Its mature leaves are 1½–2 inches long, and about one line wide, linear, the extremity obtuse, margin recurved, and the narrow spaces between the midrib and the margin white with minute pubescence; the lateral ribs are undistinguishable. The flowers are not so fleshy as those of the former, and fewer; the peduncle and calyx are much longer and more attenuated; and their flowering-season is in September and October. Moreover the habit is very different, the stem and branches being straight, slender, erect, and attaining a height of 3–4 feet and more. For these reasons the plant may probably be held to have a claim to specific rank.

A short time ago a peculiar look about its foliage attracted attention, it appearing to be plentifully interspersed with large greenish flowers! On examination it turned out that these pseudo-floral shapes were nothing but very curiously regular malformations of the leaves, bearing some resemblance (especially where the plant is dwarfed) to some papilionaceous flowers with the wings removed, and also to the galea of certain species of *Pterostylis.*

The midrib of the leaf is strongly developed and recurved towards the stalk; the margin has evidently been retarded in growth, but, on the contrary, the space between it and the midrib greatly extended, viz. from 3–10 times its dimension, over which the lateral ribs extend in the normal leaf, also strongly developed. Thus a kind of inverted pitcher is produced, whose trumpet-shaped opening is turned downwards or sideways, never upwards. (See figs. 1–4.) Their size varies according to age, development, &c., but ranges between $\frac{1}{4}$ and $\frac{3}{4}$ of an inch in length, and about one third of that measure in the other directions. Their pale green to light yellow tint contrasts well with the dark glabrous green of the upper, and the white of the lower surfaces of the leaves, and renders them very conspicuous, while strongly marked ribs render their resemblance to an orchidaceous flower rather striking. It is to be noticed, however, that the interior shows scarcely any trace of the ribs. I cannot remember having ever noticed similar regular malformations of the leaves in the two other forms of *Beyeria* mentioned above; it appears therefore that they are peculiar to *Beyeria linearis.*

What causes them? Apparently a minute fungus inhabiting the interior, and therefore the protected part, of the pitcher. Examining this, there may be noticed a delicate whitish dust, as if it were slightly sprinkled with flour. The most deeply seated portions in some specimens are also seen to be thickly covered with microscopic threads crossing each other at and near right angles (somewhat resembling spiders' web), and entangling in great numbers rod-like brownish-yellow spores scarcely visible even under a magnifying power of above 100. The length of these spores exceeds the width; and the ends are not rounded, but sharply angular.

Scraping a minute portion of the surface outside of the area where this web predominated (say $\frac{1}{50}$ of an inch) and submitting it to a magnifying power of about 220, the whole field of the microscope presented a maze of most beautiful mycelium, the extending branches of which seemed invariably to bifurcate at an angle of (or near) 60°, with short ones, consisting of one to several cells, at right angles to the main direction.

The more slender portions of the "stem" and most of the branches showed a distinct bead-like cell-structure, while in the wider parts the cells appeared to have joined consecutively by absorption of the adjoining cell-wall. An outer and inner integument could be plainly discerned, and an irregular canal extending within the latter, filled with the brownish-yellow rod-like bodies noted above as entangled among the threads of the web mentioned (or something extremely similar, but much smaller). The prevailing form of the cells appeared to be that of a trapezium; but rhombic and hexagonal forms were by no means rare.

The works of reference at my command are not sufficient to determine even the genus; thus I am unable to assign a name to this remarkable object, but hope that the sketch and the accompanying specimen will suffice to enable one of the distinguished mycologists of the Linnean Society to assign a suitable appellation to it. If new, I would beg to suggest to name it specifically after my highly valued friend Mr. Thomas D. Smeaton, of Adelaide, who has most unobtrusively for many years promoted microscopical studies very assiduously, and to whom I am very much obliged for placing a valuable microscope at my command.

[*Note.*—The sketch and specimen sent by the author were insufficient to determine the fungus; the former is therefere omitted.]

DESCRIPTION OF PLATE XXI.

Fig. 1. Branchlet of *Beyeria opaca*, F. v. Muell., var. *linearis,* showing the peculiar flower-like malformations of the leaves in various stages and positions; slightly enlarged.

Fig. 2. Single form, lateral view, ×2.

Fig. 3. The same as seen from above, ×2.

Fig. 4. The same from below, ×3.

The drawings were made from fresh specimens by the author.

Contributions to the Flora of Madagascar.—Part I. Polypetalæ.

By J. G. BAKER, F.R.S., F.L.S.

[Read November 16, 1882.]

(PLATES XXII. & XXIII.)

DURING the last few years our resident English collectors have worked energetically in the exploration of the botany of Madagascar, principally of the elevated central provinces. In the 'Journal of Botany' for 1882 I described a selection of the principal novelties sent home by the Rev. R. Baron and Dr. Parker up to the autumn of 1881. Since that date several fresh boxes have arrived from Mr. Baron, carrying up his collecting-numbers to above 2100; and Dr. Parker, who is now in England on account of his health, has brought home a considerable quantity of additional material. The present paper contains a notice of the most interesting Polypetalæ which these new contributions include, with a few additions from other sources. Type specimens of all the novelties described will be found in the Kew Herbarium, and a large number of them also at the British Museum; and I hope at some future time to deal with the Monopetalæ, Incompletæ, and Monocotyledones of the same collections.

THALAMIFLORÆ.

CLEMATIS DISSECTA, n. sp.

Scandens, ramulis gracillimis apice pilosis, foliis trifidis petiolatis segmentis deltoideis decompositis lobis ultimis parvis linearibus acutis, floribus solitariis axillaribus longe pedunculatis, pedunculis folio subæquilongis, sepalis oblongis margine tomentosis, staminibus quam flos duplo brevioribus, carpellis dense albo-pilosis.

A climbing shrub, with very slender branchlets, pilose only towards the tip. Leaves opposite, petioled, tripartite, glabrous, each division deltoid, under an inch long and broad, with a petiolule nearly as long as the lamina, the ultimate segments lanceolate, acute, $\frac{1}{8}$–$\frac{1}{6}$ in. long. Flowers solitary, on ascending axillary peduncles about as long as the leaves, with a small compound bract below the middle. Sepals oblong, above $\frac{1}{2}$ in. long. Stamens half as long as the sepals; filaments flattened, pilose; anthers oblong. Carpels in the flowering stage as long as the stamens; the ovary and lower part of the style densely pilose.

Fruit unknown.—Central Madagascar, *Baron* 2037! Allied to *C. pimpinellifolia*, Hook. Ic. t. 77, a more robust plant with much less compound leaves, known only in the fruiting stage (*Lyall* 108!). I feel satisfied that Hildebrandt's 3062, referred by Hoffmann to *C. grata*, Wall., is quite distinct from the Indian species.

WORMIA ARTOCARPIFOLIA, n. sp.

Arborea, ramulis glabris, foliis longe petiolatis late oblongis obtusis basi rotundatis obscure serrulatis utrinque viridibus facie glabris dorso obscure sericeis venis primariis rectis erecto-patentibus 9–10-jugis, floribus 6–8 in spicas densas scorpioideas pedunculo sericeo dispositis, sepalis obovatis obtusis dorso sericeis, petalis obovatis, antheris linearibus filamento brevi applanato, carpellis circiter 10 angustis.

A tree, with moderately stout woody terete branchlets. Petiole about 3 in. long; blade 6–9 in. long, 4–5 in. broad, rounded at both ends, thick and coriaceous in texture, green and quite glabrous on the upper surface when mature, obscurely silky mainly on the erecto-patent main veins beneath, the main veins connected by fine oblique distinct anastomosing veinlets. Flowers 6–8, in a close terminal unilateral scorpioid spike, on a silky peduncle 1–2 in. long, seen in the bud-stage only. Sepals ½ in. long, much imbricated, rigidly coriaceous, very obtuse, silky on the back. Petals obovate. Stamens very numerous, uniform, as long as the petals, with long linear anthers and short free flattened filaments. Carpels about 10, seen only in a very young state. —Forest between Tankay and the east coast, 40 miles from the latter, *Baron* 1596!

TETRACERA PAUCIFLORA, n. sp.

T. ramulis pilosis, foliis subsessilibus oblanceolato-oblongis obtusis integris rigide coriaceis utrinque parce pilosis, floribus 1–3nis terminalibus, sepalis 4 late oblongis glabris, petalis oblongo-spathulatis calyci æquilongis, fructu folliculari piloso.

A woody climber, with slender branchlets, pilose towards the tip. Leaves alternate, with a short petiole winged down to the base, 2–3 in. long, ¾–1 in. broad above the middle, obscurely pilose on both surfaces, with 5–6-jugate ascending parallel main veins distinct nearly to the margin. Flowers terminal, shortly peduncled, solitary or capitate. Sepals 4, ¼ in. long, ⅙ in. broad, much imbricated, persistent, densely pilose inside. Petals not protruded beyond the sepals. Filaments unequal in length, glabrous, filiform, club-shaped at the tip. Follicles 4, pilose, oblong, rigidly coriaceous, ½ in. long, tipped with the straight indurated persistent style.—Majunga, on the west coast, *Commodore Wykeham Perry*, gathered in July 1879. Allied to *T. Boiviniana*, Baillon in Adansonia, vii. 300, t. 7.

ALSODEIA ARBOREA, *Thouars*.

This has been refound by Mr. Baron (1609) in woods between Tankay and the east coast. It is fully described by Tulasne in Ann. Sc. Nat. ser. 5, vol. ix. p. 309. *Celastrus nossibæus*, O. Hoffm. Sert. Madag. p. 12, founded on Hildebrandt's no. 3176, is certainly not a *Celastrus*, but an *Alsodeia*, and, I believe, identical with *A. squamosa*, Boivin; Tulasne, *loc. cit.* p. 307.

POLYGALA MUCRONATA, n. sp.

Perennis, cæspitosa, ramulis brevibus breviter pilosis, foliis breviter petiolatis orbiculari-oblongis obscure pilosis obtusis mucronatis, racemis laxis paucifloris terminalibus, bracteis caducis, pedicellis calyci subæquilongis, sepalis oblongis omnibus viridibus, alis exterioribus sepala duplo superantibus, carina lata apice cristata alis paulo longiore, capsula orbiculari.

A minute densely tufted perennial herb, with slender shortly pilose ascending or spreading stems, not more than 2–3 in. long. Leaves ¼ in. long, shortly petioled, moderately firm in texture, dull green, minutely pilose on both surfaces. Racemes 5–6-flowered, the lower flowers from the axils of fully developed leaves. Inner sepals oblong, mucronate, ⅛ in. long, white-edged, just like the outer in texture and colour. Keel very broad, ⅙ in. long, red-purple, copiously crested at the tip. Capsule orbicular, not seen fully developed.—Central Madagascar, *Baron* 2147! Allied to *P. irregularis*, Boiss.

POLYGALA EMIRNENSIS, *Baker*.

Perennis, glabra, ramis elongatis gracillimis, foliis lanceolatis brevissime petiolatis, racemis terminalibus multifloris laxis subsecundis, pedicellis brevissimis, bracteis minutis deltoideis persistentibus, alis obovatis petaloideis rubellis quam sepala exteriora 3-4plo longioribus, carina alis æquilonga apice cristata, capsual obovata emarginata.

A densely-tufted perennial herb, with very slender trailing or ascending stems 6–9 in. long. Leaves nearly sessile, ¼–⅓ in. long, narrowed to both ends, moderately firm in texture, 1-nerved, bright green, glabrous. Racemes free from the leaves, moderately dense, about an inch long; pedicels very short; bracts minute, deltoid. Outer sepals oblong, obtuse, green, white-edged, ½ line long; wings ⅛ in. long, obovate-unguiculate, nearly white, with a green keel and two faint green inarching nerves. Keel pinkish, not longer than the wings, densely fimbriated at the tip. Capsule obovate, not seen fully mature.—Central Madagascar, *Baron* 2123! A near ally of *P. abyssinica*, Fresen., and *P. leptalea*, DC.

SYMPHONIA (§CHRYSOPIA) MELLERI, n. sp.

Glabra, ramulis crassis, foliis subsessilibus obovatis obtusis basi cuneatis rigide coriaceis venis crebris subtilibus erecto-patentibus, floribus terminalibus umbellatis, bracteis magnis obtusis, pedicellis crassis flori æquilongis, calycis magni segmentis orbicularibus valde imbricatis, disco quam calyx duplo breviore, dentibus staminiferis lanceolatis quam tubus duplo brevioribus, stigmatibus elongatis cylindricis erecto-patentibus.

An erect tree 20–40 feet high, glabrous in all its parts, with thick straight woody ultimate branchlets, with grey epidermis. Leaves 2–3 in. long, 1–1¼ in. broad, very obtuse, thick and rigidly coriaceous, narrowed gradually from the middle to the base, with fine close erecto-patent simple or forked veins visible on both surfaces. Flowers in whorls of five or six at the tip of the stout branchlets, surrounded by a whorl of obovate or suborbicular bracts ⅓–½ in. long; pedicels about ½ in. long, straight, stout, erect, articulated at the base. Calyx ½ in. long; segments suborbicular, much imbricated. Petals pink, fleshy, orbicular, under an inch long. Disk cupular, half as long as the calyx. Stamens united in a tube ½ in. long, with 5 lanceolate segments half as long as the tube. Style with 5 erecto-patent forks ⅙ in. long.—Between Tamatave and Antananarivo, in marsh-lands by a river, *Dr. Meller*, gathered in 1862.

SYMPHONIA (§ CHRYSOPIA) PAUCIFLORA, n. sp.

Glabra, ramulis gracillimis, foliis petiolatis oblongo-lanceolatis acuminatis subcoriaceis venis crebris subtilibus erecto-patentibus, floribus solitariis axillaribus et terminalibus flori subæquilongis, calycis parvi segmentis ovatis valde imbricatis, disco cupulato calyci subæquilongo, dentibus stamineis lingulatis quam tubus 2–3plo brevioribus, lobis stigmatosis brevibus stellatim patulis.

An erect tree, glabrous in all its parts, with very slender straight branchlets. Leaves opposite, shortly petioled, 1½–2 in. long, ½ in. broad at the middle, deltoid at the base, narrowed gradually into a long point, subcoriaceous, with fine close erecto-patent veins connected by a vein just within the margin. Flowers solitary, on erecto-patent slender axillary or terminal pedicels $\frac{1}{3}$–$\frac{1}{2}$ in. long. Calyx $\frac{1}{8}$ in. long, $\frac{1}{6}$ in. broad; segments coriaceous, obtuse, much imbricated. Stamens with a cylindrical tube $\frac{1}{6}$ in. long, and 5 lingulate lobes bearing 3 anthers each. Stigmatic lobes oblong-lanceolate, stellately patent, not more than $\frac{1}{2}$ line long.—Woods between Tankay and the east coast, *Baron* 1526 *a*!

SYMPHONIA (§ CHRYSOPIA) EUGENIOIDES, n. sp.

Glabra, ramulis gracilibus, foliis petiolatis oblongis acutis basi rotundatis coriaceis venulis crebris subtilibus erecto-patentibus, floribus solitariis terminalibus, pedicellis flori subæquilongis, calycis parvi dentibus ovatis imbricatis, disco cupulato quam calyx longiore, dentibus stamineis lanceolatis quam tubus duplo brevioribus, lobis stigmatosis lanceolatis stellatim patentibus.

An erect tree, with slender woody branches. Leaves opposite, distinctly petioled, rigidly coriaceous, 2–2$\frac{1}{2}$ in. long, 1–1$\frac{1}{4}$ in. broad at the middle, rounded at the base, with fine close distinct ascending veins, connected by an intramarginal nerve. Flowers few, solitary, on moderately stout terminal pedicels about $\frac{1}{2}$ in. long. Calyx $\frac{1}{8}$ in. broad, $\frac{1}{12}$ in. long, with 5 ovate slightly imbricated coriaceous teeth. Staminal tube $\frac{1}{6}$ in. long, with 5 lanceolate teeth $\frac{1}{8}$ in. long, bearing 3 anthers each. Cupular disk $\frac{1}{8}$ in. long. Stigmatic lobes lanceolate, twice as long as in *S. pauciflora*.—Woods between Tankay and the east coast, *Baron* 1638 *a*! A near ally of the last species.

SYMPHONIA (§ CHRYSOPIA) LEPIDOCARPA, n. sp.

Fruticosa, glabra, ramulis confertis, foliis parvis rigide coriaceis breviter petiolatis obovato-oblongis obtusis, floribus solitariis terminalibus brevissime pedicellatis, sepalis minutis orbicularibus late imbricatis, ovario ovoideo obliquo squamis minutis peltatis adnatis lepidoto, stylo brevi, stigmatibus 5 lanceolatis patulis stylo æquilongis.

A small shrub, glabrous in all its parts, with crowded branchlets. Leaves rigidly coriaceous, green and glabrous on both surfaces, $\frac{1}{2}$ in. long, $\frac{1}{4}$ in. broad, obtuse, narrowed gradually from the middle to the top of a very short petiole. Flowers solitary at the end of the branchlets, on a pedicel $\frac{1}{8}$–$\frac{1}{6}$ in. long. Calyx $\frac{1}{2}$ line long, of 5 orbicular coriaceous imbricated sepals. Petals not seen. Mature ovary under $\frac{1}{2}$ in. long, covered with spaced minute brownish adnate entire membranous peltate scales; style cylindrical, $\frac{1}{2}$ line long; stigmas 5, lanceolate, patulous.—

Central Madagascar, in forests of the province of Imerina, *Baron* 1317! A near ally of *Chrysopia microphylla*, Cambess. Mem. Guttif. et Ternström. tab. 4.

GARCINIA (§ MANGOSTANA) PAUCIFLORA, n. sp.

Arborea, glabra, foliis breviter petiolatis magnis obovato-oblongis subcoriaceis subacutis venis primariis ascendentibus venulis perspicuis crebris subparallelis connexis, floribus fœmineis 2–3 terminalibus brevissime pedicellatis, sepalis 4 coriaceis decussatis orbicularibus valde imbricatis, ovario subgloboso staminodiis liberis circiter 20 cincto, stigmate magno peltato margine 8-lobato.

An erect tree, with stoutish straight branchlets, glabrous in all its parts. Leaves opposite; petiole $\frac{1}{3}$ in.; blade subcoriaceous, 5–6 in. long, 2 in. broad, deltoid at the base, bright green and glabrous on both surfaces, the ascending main veins connected by close very oblique subparallel fine veinlets. Female flowers at the end of the branchlets on very short pedicels. Calyx $\frac{1}{3}$ in. long; sepals orbicular, coriaceous. Petals not seen. Ovary suborbicular, about as long as the sepals, crowned by a sessile peltate stigma $\frac{1}{6}$ in. in diam., with about 8 deltoid contiguous lobes and surrounded by a ring of about 20 minute free rudimentary stamens.—Forest of Alamazaotra, *Baron* 1382!

GARCINIA (§ MANGOSTANA) MELLERI, n. sp.

Arborea, glabra, foliis petiolatis magnis obovato-oblongis obtusis, venis primariis ascendentibus venulis occultis, floribus fœmineis racemosis, sepalis 4 coriaceis decussatis orbicularibus, ovario oblongo staminodiis liberis circiter 20 cincto, stigmate magno peltato 4-lobato.

A tree, glabrous in all its parts, with stout ultimate branchlets. Petiole an inch long. Leaves rigidly coriaceous, bright green and glossy above, 6–8 in. long, 2–3 in. broad, deltoid at the base, with numerous rather ascending main veins, the intermediate veinlets not visible. Female flowers in sparse racemes at the end of the branchlets, on erecto-patent pedicels above $\frac{1}{2}$ in long. Sepals coriaceous, finally reflexing, $\frac{1}{4}$ in. long. Petals not seen. Ovary oblong, finally $\frac{5}{8}$–$\frac{3}{4}$ in. long, $\frac{1}{3}$ in. in diam., surrounded by a ring of free rudimentary stamens, crowned by a 4-lobed peltate stigma $\frac{1}{4}$–$\frac{1}{3}$ in. in diam.—Central Madagascar, *Baron*! Between Tamatave and Antananarivo, *Dr. Meller*! Both this and the preceding are near allies of the well-known Malayan *G. Mangostana*, L.

Psorospermum venulosum, *Baker*.

P. ramulis glabris, foliis breviter petiolatis ovatis acutis parvis glabris dorso pulchre venulosis, cymis 6–12-floris breviter pedunculatis, pedicellis pilosis flore longioribus, sepalis ovatis acutis, staminibus circiter 15 pentadelphis.

A much-branched shrub, with slender terete woody branchlets glabrous up to the tip, ancipitous below the nodes. Petiole $\frac{1}{8}$–$\frac{1}{6}$ in., blade 1–$1\frac{1}{2}$ in. long, cuspidate, rounded or deltoid at the base, quite glabrous, thin in texture, bright green on the face, the veins and veinlets distinctly visible on the under surface, anastomosing in intramarginal arches. Peduncle not more than $\frac{1}{4}$ in.; pedicels $\frac{1}{8}$–$\frac{1}{6}$ in., ferrugineo-pilose. Sepals $\frac{1}{8}$ in. long, very acute, pilose on the back, with copious black dots and lines. Petals oblong, subacute, half as long again as the calyx, hairy on the face and edge. Phalanges of stamens as long as the calyx, strap-shaped, pilose. Hypogynous scales lingulate, $\frac{1}{3}$–$\frac{1}{4}$ as long as the stamens. Styles as long as the ovary, connate at the base. Berry not seen.—Central Madagascar, *Bojer*!

Psorospermum brachypodum, n. sp.

P. ramulis glabris, foliis breviter petiolatis oblongis acutis magnis integris glabris, cymis multifloris brevissime pedunculatis, pedicellis pilosis quam flos paulo longioribus, sepalis ovalis acutis, staminibus circiter 15 pentadelphis, baccis parvis ovoideis.

A much-branched shrub, with dark-brown perfectly glabrous woody ultimate branchlets, dilated and ancipitous below the nodes. Petiole $\frac{1}{4}$ in., blade 4–6 in. long, quite entire, $1\frac{1}{2}$–3 in. broad at the middle, narrowed gradually to the base and acute point, quite glabrous, bright green on the face, so firm in texture that the pellucid dots are hidden, with about 10 pairs of distinctly marked erecto-patent main veins. Flowers 20–30 in a dense cyme; peduncles at most $\frac{1}{2}$ in., pedicels $\frac{1}{8}$–$\frac{1}{6}$ in. long. Sepals $\frac{1}{12}$ in. long, pilose, with copious brown lines and dots. Phalanges of stamens not quite as long as the sepals. Berry ovoid, glabrous, $\frac{1}{6}$ in. in diam. when dried, with 4–5 cells with one seed in each. Styles in the fruiting stage not more than $\frac{1}{12}$ in. long.—St. Mary, South Madagascar, *Forbes*!

Psorospermum ferrovestitum, n. sp.

P. ramulis pilosis, foliis parvis breviter petiolatis facie viridibus subcalvatis dorso persistenter ferrugineo-tomentosis, cymis multifloris breviter

pedunculatis, pedicellis flore longioribus, sepalis ovato-lanceolatis acutis ferrugineo-tomentosis, petalis breviter exsertis, staminibus 15 pentadelphis calyci æquilongis.

An erect tree, with crowded slender terete branchlets, coated with short ferruginous hairs. Leaves not more than an inch long, distinctly petioled, subcoriaceous, green and subglabrous above when mature, densely coated beneath with persistent bright ferruginous tomentum. Cymes copious, shortly peduncled, 10–15-flowered. Calyx $\frac{1}{6}$ in. long, densely ferrugineo-tomentose Petals oblong, little longer than the calyx, copiously black-dotted. Stamens $\frac{1}{6}$ in. long, in five bundles of three each; united filaments pilose; anthers minute, orbicular. Ovary pilose. Fruit not seen.—Central Madagascar, *Baron*!

PSOROSPERMUM FORBESII, n. sp.

P. ramulis glabris, foliis oblongis subacutis integris sessilibus vel brevissime petiolatis utrinque glaberrimis, cymis multifloris breviter pedunculatis, pedicellis elongatis ferrugineo-pilosis, sepalis ovatis acutis, staminibus circiter 15 pentadelphis, baccis ovoideis.

A much-branched shrub, 4–5 feet high, with woody slender bright brown branchlets, dilated and flattened below the nodes. Leaves reaching a length of 2–3 inches, 1–2 in. broad, rounded at the base, thin in texture, with copious black dots, the 6–8-jugate rather ascending main veins fine but distinct. Peduncles not above $\frac{1}{2}$ in. long; pedicels finally as long, both ferrugineo-pilose. Sepals $\frac{1}{8}$ in. long, pilose, with copious black lines and dots. Petals oblong, hairy on the face, half as long again as the calyx. Phalanges of stamens as long as the sepals, the united filaments strap-shaped and pilose. Hypogynous scales lingulate, $\frac{1}{3}$–$\frac{1}{4}$ as long as the stamens. Ovary ovoid glabrous, the distinctly capitate styles not more than $\frac{1}{2}$ line long.—Cape St. Mary, on the south coast, *Forbes*; and gathered twice by Gerrard, 13! and 148!

PSOROSPERMUM PAUCIFLORUM, n. sp.

P. ramulis glabris, foliis breviter petiolatis oblongo-lanceolatis acutis integris basi cuneatis utrinque glabris, cymis 6–8-floris breviter pedunculatis, pedicellis brevibus, sepalis ellipticis obtusis dorso pilosis, staminibus circiter 15 pentadelphis, baccis globosis.

A much-branched shrub, with slender glabrous woody brown ultimate branchlets, thickened and flattened below the nodes. Petioles $\frac{1}{8}$–$\frac{1}{6}$ in., blade 2–3 in. long, $\frac{3}{4}$–1 in. broad at the middle,

narrowed gradually to the base and acute point, quite glabrous on both surfaces, so thick in texture that no glandular dots are visible, and the distant erecto-patent main veins are fine and faint. Peduncle at most $\frac{1}{4}$ in. long; pedicels not more than $\frac{1}{8}$–$\frac{1}{6}$ in. Sepals $\frac{1}{8}$ in. long, with many black dots and lines. Petals a little longer than the sepals, elliptic, subacute, hairy on the face. Phalanges of stamens shorter than the sepals. Berry glabrous, $\frac{1}{4}$ in. in diam., with a single half-orbicular laterally flattened seed $\frac{1}{8}$ in. long in each of the five cells.—Central Madagascar, *Baron* 450!

PSOROSPERMUM MICROCARPUM, n. sp.

P. ramulis glabris, foliis distincte petiolatis late ellipticis parvis subintegris facie glabris dorso tenuiter pilosis, cymis 5–6-floris terminalibus breviter pedunculatis, pedicellis quam flos paulo longioribus, sepalis ovato-oblongis obtusis, staminibus circiter 15 pentadelphis, baccis parvis globosis.

A much-branched shrub with slender drab terete branchlets. Petiole $\frac{1}{4}$ in. long; blade 1–1$\frac{1}{4}$ in. long, $\frac{3}{4}$–1 in. broad, moderately firm in texture, green on both surfaces, not perceptibly gland-dotted, with 6–7 pairs of distinctly marked ascending main veins. Peduncles not more than $\frac{1}{2}$ in. long; pedicels $\frac{1}{8}$–$\frac{1}{6}$ in., thinly pilose. Calyx $\frac{1}{12}$ in. long, spreading from the berry, hairy on the outside. Phalanges of stamens as long as the sepals. Berry glabrous, $\frac{1}{8}$–$\frac{1}{6}$ in. in diam. in the dried specimens. Styles $\frac{1}{12}$ in. long, with a distinctly capitate stigma.—Central Madagascar, *Rev. R. Baron*, received Oct. 1881.

All these five species of *Psorospermum*, along with *P. Fanerana* and *P. androsæmifolium*, described in Trimen's 'Journal,' 1882, p. 19, belong to a group different from any of those of Spach, marked by stamens in five bundles, nearly always 3 in each, and non-coriaceous entire leaves greenish on both surfaces: There is a misprint, *loc. cit.*, in the description of *P. androsæmifolium*, of which the calyx is $\frac{1}{12}$ in., not $\frac{1}{2}$ in. long. The flowers of *Psorospermum* never rival in size our familiar Hypericums.

RHODOLÆNA ALTIVOLA, *Thouars, Hist.* t. 13.

Mr. Baron has been fortunate enough to rediscover this finest of all the Chlænads, which, so far as we know, has not been gathered since its original discovery by Du Petit Thouars nearly a century ago. The following description is drawn up from the specimens which he has sent home (nos. 1980! and 2173!).

A shrub, apparently erect, glabrous in all its parts, with terete branchlets. Stipules minute, deciduous, deltoid. Leaves alternate, shortly petioled, oblong, obtuse, 2–3 in. long, subcoriaceous, with erecto-patent main veins anastomosing in distinct arches a space within the margin. Flowers solitary or in pairs on a terminal peduncle 1–1½ in. long; involucre with 4 minute deltoid lobes; pedicels very short; flowers each with a pair of minute deltoid bracteoles at the base. Calyx ½ in. long, with three orbicular or obovate-obtuse much imbricated oblique coriaceous segments. Expanded corolla 2 in. in diam; petals 5, obovate-spathulate, bright purple, 2 in. long, 1 in. broad. Stamens about 20, very unequal in length, the longest half as long as the petals; filaments filiform, glutinous, free down to the base; anthers minute, orbicular, attached by the middle of the back. Ovary globose, glabrous, 3-celled. Style filiform, above an inch long. Fruit not seen.

XEROCHLAMYS PILOSA, *Baker in Trimen's Journ.* 1882, p. 45.

Mr. Baron has twice again (nos. 947 and 1873) gathered this new genus, which differs from *Leptolæna* not only in involucre and fruit, but also by its indefinite stamens. Some of the later specimens show as many as ten teeth to the involucre; but I think all the three numbers belong to one and the same species. It is figured in Hooker's Icones, tab. 1413.

LEPTOLÆNA PAUCIFLORA, n. sp.

L. ramulis pilosis, foliis brevissime petiolatis parvis suborbicularibus obtusis, floribus paucis vel solitariis terminalibus brevissime pedicellatis, involucri glabri subglobosi dentibus 6–8 minutis deltoideis.

A much-branched shrub, with very slender densely pilose woody ultimate branchlets. Petiole not more than half a line long, densely pilose; blade ½–⅝ in. long, broadly rounded at both ends, coriaceous, rigid, green and glabrous on both surfaces. Flowers few together on very short pilose pedicels at the end of the branchlets. Involucre surrounding the immature fruit a glabrous coriaceous dark-brown cup ⅙–⅕ in. long and broad, probably rather fleshy in the living plant, with 6–8 minute deltoid teeth. Sepals 3, orbicular, densely pilose on the back, ⅙ in. long. Petals oblong, dark purple, glabrous, as long as the calyx. Stamens about 10, exserted finally a little from the involucre, with filiform filaments and minute orbicular anthers. Immature capsule hard, globose, densely pilose, filling up the involucre.—Between Tamatave and Antananarivo, gathered by Dr. Meller in July 1862, a single specimen in immature fruit; and lately rediscovered by Mr. Baron in forests of the province of Imerina (1390). Very different from the single known type species of Thouars, *L. multiflora*, by its few flowers and small obtuse leaves. *L. multiflora* has been gathered by Bojer, Forbes, and lately in the north-west of the island by Hildebrandt (3306); but none of our specimens show the mature fruit.

LEPTOLÆNA TURBINATA, n. sp.

L. ramulis minute pilosis, foliis brevissime petiolatis parvis obovato-oblongis rigide coriaceis, floribus solitariis terminalibus brevissime pedicellatis, involucro glabro turbinato dentibus minutis fructum pilosum involvente persistente.

A much-branched shrub, with slender terete crowded woody branchlets. Leaves alternate, minutely petioled, ½ in. long, obtuse, sometimes distinctly emarginate at the apex, deltoid at the base, rigidly coriaceous, dark green and glabrous on both surfaces, with erecto-patent main veins anastomosing by arches just within the margin. Flowers terminal, on very short pilose peduncles. Involucre a glabrous bright brown turbinate persistent cup ¼ in. long, closing in over the pilose capsule, which completely fills it; the teeth at throat minute and obscure.—East coast of Madagascar, *Baron* 1560! A near ally of the preceding species.

SCHIZOLÆNA EXINVOLUCRATA, n. sp.

S. ramulis foliisque glaberrimis, foliis oblongis subcoriaceis obtuse cuspidatis, floribus paucis axillaribus 1–2nis pedicellatis solitariis haud involucratis, calycis minuti stellato-pubescentis lobis 3 orbicularibus, petalis oblongis, staminibus brevibus permultis, ovario globoso dense piloso.

A shrub, quite glabrous in all its parts except the calyx, with very slender terete woody grey ultimate branchlets. Petiole about ¼ in. long; blade oblong, subcoriaceous, 1–2 in. long, entire, broadly rounded at the base, narrowed suddenly to an obtuse point, green on both surfaces, the fine main veins anastomosing in intramarginal arches. Flowers few, axillary, solitary on 1–2nate peduncles about ½ in. long. Involucre entirely suppressed. Calyx not more than half a line long, coriaceous, stellato-pilose, with 3 minute suborbicular lobes. Corolla of 5 oblong obtuse petals about ¼ in. long and ⅙ in. broad, much imbricated before the flower opens. Stamens densely packed, 100 or more, with short filiform filaments and minute suborbicular anthers. Ovary globose, densely pilose, 3-celled; style filiform, simple, as long as the ovary.—Madagascar, *Gerrard* 20! Nov. 1865. As compared with *S. rosea*, Thouars, Hist. t. 12, this has a precisely similar corolla, and leaves similar both in shape and veining; but the flowers are axillary, single, and without any involucre, and the calyx is extremely minute.

KOSTELETSKYA HISPIDA, n. sp.

K. ramulis dense retrorsum hispido-pilosis, foliis suborbicularibus serratis longe petiolatis apice leviter palmatim trilobatis, floribus 1–3nis axillaribus distincte pedicellatis, bracteolis linearibus 10–12, calycis segmentis ovato-lanceolatis, petalis quam calyx 2–3plo longioribus, carpellis hispidis dorso acute angulatis.

A much-branched herb, 1–3 feet high, with slender terete branchlets, densely clothed with short drab reflexed rather bristly hairs. Petiole sometimes 1–1½ in. long; blade 1–2 in. long and broad, cordate, membranous, green and hairy on both surfaces, crenate, with three short deltoid apical lobes. Flowers 1–3 in the axils of the leaves, on pilose slender pedicels under an inch long. Epicalyx of 10–12 hispid linear persistent bracteoles shorter than the sepals. Calyx hispid, $\frac{1}{6}$ in. long in the flower-stage, growing out to $\frac{1}{4}$ in., the segments two or three times as long as the tube. Petals yellow, obovate-unguiculate, pilose, $\frac{1}{2}$–$\frac{5}{8}$ in. long. Column nearly as long as the petals, the capitate styles $\frac{1}{12}$–$\frac{1}{8}$ in. long. Capsule membranous, hispid, $\frac{1}{3}$ in. in diam.; the 5 carpels triquetrous and very bristly on the back. Seeds solitary, erect, green, reniform, glabrous, $\frac{1}{12}$ in. long.—Gathered long ago in Central Madagascar by Dr. Lyall (no. 192); and now Mr. Baron has sent it in flower (893); and Dr. Parker gathered at Ambohimango fine specimens with mature fruit.

PAVONIA MACROTIS, n. sp.—Hibiscus azureus, *Bojer MSS.*

Suffruticosa, ramulis pilosis et tomentosis, foliis ovatis profunde cordatis parvis petiolatis crenatis facie tenuiter dorso dense incanis, floribus axillaribus solitariis pedunculatis, bracteolis 9–10 subulatis persistentibus dense pilosis, calycis tubo brevi segmentis lanceolatis, petalis parvis rubris, carpellis oblongis turgidis exaristatis.

A much-branched small shrub, the ultimate branchlets very slender, tomentose, and in addition loosely pilose. Leaves distinctly petioled, cordate-ovate, obtuse, the largest 1–1½ in. long, crenate, the rounded basal lobes half as long as the rest of the blade, the texture moderately firm, the upper surface dull green and thinly tomentose, the lower matted with a thin coat of whitish tomentum. Flowers solitary, on slender densely pilose axillary pedicels sometimes an inch long. Epicalyx of 9–10 subulate persistent bracteoles $\frac{1}{6}$–$\frac{1}{4}$ in. long, free down to the base. Calyx $\frac{1}{6}$ in., finally $\frac{1}{4}$ in. long, densely pilose. Petals obovate-cuneate, $\frac{1}{3}$ in. long. Column of styles and stamens a little shorter than the petals. Fruit globose, membranous, $\frac{1}{6}$ in. in diam., of 5 oblong hairy carpels without any awn.—Gathered long ago in Central Madagascar by Bojer and Lyall (189), and now refound by Kitching (Ankaratra mountains) and Baron (615! 933! 1869!). Allied to the Cape *P. præmorsa*, Willd. (*P. cuneifolia*, Cav.).

PAVONIA PLATANIFOLIA, n. sp.

Perennis, ramis dense hispidis, foliis petiolatis cordato-orbiculatis palmatim 5-lobatis serratis utrinque pilosis, floribus multis axillaribus superioribus racemosis, bracteolis 8 linearibus persistentibus calyci æquilongis, petalis rubris quam calyx 2–3plo longioribus, carpellis oblongis turgidis breviter 1-aristatis.

A robust much-branched perennial herb, the branches calvate, terete, and brown-black low down, densely shortly hispid upwards. Petiole of the lower leaves above an inch long; blade reaching 3–4 inches both in length and breadth, with five deltoid lobes and large teeth, moderately firm and thick in texture, green and shortly hispid above, dull green and densely pilose beneath. Flowers abundant, 2–3nate on short peduncles, the upper cymes crowded and only minutely bracteated, the lower from the axils of leaves 1–2 in. broad. Epicalyx of 8 linear densely pilose persistent bracteoles, which are free down to the base, as long as the calyx and adpressed to it. Flower-calyx $\frac{1}{6}$ in. long, densely pilose, the deltoid segments as long as the campanulate tube. Petals bright red, obovate-cuneate, $\frac{1}{2}$ in. long. Column as long as the petals. Fruit globose, $\frac{1}{4}$ in. in diam., consisting of five oblong turgid membranous carpels, each with a short retrorsely hispid awn from the inner angle, and each containing a single pale-brown glabrous seed.—Andrangaloaka, *Dr. Parker*. "Flowers pale scarlet. Bark tough, would make good string or rope." Allied to *P. Bojeri*, *P. urens*, and *P. Schimperiana*.

HIBISCUS OXALIFLORUS, *Bojer*, *Hort. Maur.* p. 28 (nomen solum).

Annuus, diffusus, ramulis gracillimis pilosis, foliis parvis petiolatis ovatis integris vel irregulariter serratis, floribus solitariis axillaribus longe pedunculatis, bracteolis 8–10 linearibus, calycis tubo brevi, segmentis ovato-lanceolatis, petalis parvis luteis, capsulis parvis globosis membranaceis, seminibus in loculo 2–3 glabris.

A diffuse annual herb, densely branched at the crown of the root, with slender wiry pilose stems $\frac{1}{2}$–1 ft. long. Petiole $\frac{1}{4}$–$\frac{1}{2}$ in. long, with a pair of minute persistent linear stipules at the base; blade $\frac{1}{4}$–$\frac{3}{4}$ in. long, obtuse or subacute, rounded or shallowly cordate at the base, entire or irregularly inciso-crenate, moderately firm in texture, green and shortly pilose on both surfaces. Flowers solitary in the axils of the leaves on slender peduncles 1–2 in. long. Epicalyx of 8–10 persistent linear bracts. Calyx campanulate, hispid, finally $\frac{1}{4}$ in. long, the segments three times as long as the tube. Petals yellow, obovate-cuneate, $\frac{1}{3}$ in. long. Capsule membranous, globose, $\frac{1}{4}$ in. in diameter, splitting into five valves and containing 2–3 glabrous seeds in each carpel.—Gathered long ago in Central Madagascar by Hilsenberg, Bojer, and Lyall (182), and now refound by Mr. Baron (798 & 912). Mr. Baron has also sent (no. 703) a single specimen of a plant with just the same habit, pubescence, flowers, and capsule, but with trifoliate leaves like those of a *Cytisus* or *Crotalaria*, the leaflets sessile, lanceolate, and entire.

HIBISCUS ELLISII, n. sp.

Fruticosus, ramulis stellato-incanis, foliis ovatis longe petiolatis simplicibus denticulatis, floribus laxe corymbosis, bracteolis 10–12 parvis rigidis lanceolatis basi connatis, calycis coriacei segmentis ovato-lanceolatis quam tubus duplo longioribus, petalis magnis splendide rubris dorso sericeis, capsulis duris globosis densissime pilosis.

A shrub, with terete woody branches, clothed with stellate brownish pubescence. Petiole 1–2 in. long; blade ovate, rounded at the base, deltoid at the tip, 3–4 in. long, subcoriaceous, green and slightly furfuraceous above, persistently coated with drab or ferruginous stellate pubescence beneath. Flowers few, in lax corymbs towards the end of the branches, on short sulcate thickened peduncles, the lower ones from the axils of the upper leaves. Epicalyx of about a dozen rigid persistent lanceolate bracteoles. Calyx above an inch long, firm in texture, densely matted with ferruginous tomentum externally, the ovate-lanceolate teeth twice as long as the campanulate tube. Petals oblong-spathulate, 2 in. long, nearly an inch broad, bright red within, persistently silky outside. Column nearly as long as the petals, the stamens extending over an inch of it. Immature capsule above an inch in diameter, woody in texture, densely pilose outside and within.—Ambohimanga, gathered by the Rev. W. Ellis in 1864. A very fine species, allied to the Mauritian *H. liliiflorus* and *H. columnaris*.

DOMBEYA GLECHOMÆFOLIA, n. sp.

Fruticosa, ramulis pilosis, foliis petiolatis cordato-orbicularibus crenatis pilosis, cymis paucifloris umbellatis, bracteolis 3 magnis deltoideis acutis pilosis persistentibus, sepalis membranaceis lanceolatis pilosis, petalis magnis rubellis obovato-cuneatis, columna staminea magna ampullæformi, staminodiis ligulatis, staminibus fertilibus 15, ovario piloso, stylo elongato, stigmatibus subulatis falcatis.

Branchlets slender, woody, terete, densely pilose. Petiole $\frac{1}{2}$–$\frac{3}{4}$ in., densely pilose; blade quite orbicular, with a deep basal sinus, $\frac{3}{4}$–$1\frac{1}{2}$ in. long and broad, moderately firm in texture, green and thinly pilose on the upper surface, densely pilose beneath. Flowers 1–3 together; peduncle 1–$1\frac{1}{2}$ in., pedicels about $\frac{1}{2}$ in., both very slender and densely pubescent. Bracteoles cordate-deltoid, adpressed to the calyx, imbricated, pale green, $\frac{1}{4}$–$\frac{1}{3}$ in. long. Sepals $\frac{1}{3}$–$\frac{1}{2}$ in. long. Petals an inch long, reddish brown, $\frac{1}{2}$ in. broad at the truncate tip. Staminal column ampullæform, half as long as the petals, the 5 linear staminodes longer than the 15 fertile stamens, which are in 2–3 irregular rows, with short free filaments and lanceolate anthers $\frac{1}{12}$ in. long. Style protruding beyond the staminodia, divided at the tip into five stigmatose hooks.—Forests of Central Madagascar, gathered lately by Mr. Pool, and sent also in 1857 by M. Bouton. This is a well-marked and handsome plant. We have a closely allied new species from the Rev. W. Ellis with still larger flowers and more densely shaggy bracteoles, peduncles and pedicels, and a much shorter staminal corona, of which the leaves are unknown.

SPARMANNIA SUBPALMATA, n. sp.

S. ramulis pilosis, foliis longe petiolatis cordato-ovatis acutis inciso-crenatis integris vel apice palmatim trilobatis membranaceis utrinque viridibus obscure stellato-pilosis, umbellis simplicibus 6–12-floris longe pedunculatis, bracteis linearibus, calycis segmentis lanceolatis dense pilosis, petalis oblongis quam calyx vix longioribus, staminibus exterioribus paucis sterilibus parce papillosis, fructu globoso longe echinato.

A shrub or small tree, with slender terete branchlets, clothed with whitish stellate pubescence. Petiole $\frac{1}{2}$–$1\frac{1}{4}$ in. long; blade

1½–2 in. long, 1–1½ in. broad, shallowly cordate, entire or distinctly 3-lobed, with the side lobes obtuse and the middle one pointed, thin in texture, bright green above, dull grey-green beneath, the stellate tufts of hair sparse and indistinct. Umbels 6–12-flowered, on pilose lateral peduncles 1–2 in. long, surrounded before expansion by a whorl of linear acuminate bracts like an involucre. Calyx ⅓ in. long., cut down nearly to the base into four lanceolate acute segments. Petals pale red, oblong-spathulate. Stamens half as long as the petals, the sterile ones few and indistinctly papillose. Ovary globose, densely echinate; style as long as the petals. Capsule under an inch in diameter, beset by dense spreading spines ⅓ in. long.—Central Madagascar, by the side of streams in the province of Imerina, *Bojer*!

SPARMANNIA DISCOLOR, n. sp. (Tab. XXII. figg. 1–8.)

S. ramulis pilosis, foliis longe petiolatis cordato-ovatis acuminatis serratis facie viridibus tenuiter stellato-pilosis dorso persistenter albido-incanis, umbellis simplicibus 12–20-floris pedunculatis, bracteis linearibus, calycis segmentis lanceolatis dense pilosis, petalis oblongis calyci æquilongis, staminibus exterioribus paucis sterilibus obscure papillosis, fructu globoso echinato.

A shrub or small tree, with slender terete densely pilose woody branchlets. Petiole ¾–1 in. long; blade 1½–2 in. long, slightly cordate, acuminate, inciso-crenate, never lobed, firmer and thicker in texture than in the last species, green and thinly stellato-pilose above, densely matted with persistent white tomentum beneath. Flowers 12–20 in simple umbels, on densely pilose slender erecto-patent axillary peduncles an inch long; bracts linear, persistent, ¼–⅓ in. long; pedicels as long as the flowers. Calyx ⅓ in. long, cut down nearly to the base into four lanceolate acute densely pilose segments. Stamens 30 or more, half as long as the petals, only a very few of the outer ones sterile and obscurely papillose. Style slender, filiform, obscurely 4-lobed at the tip. Fruit a globose 4-valved loculicidal capsule ½ in. in diam., exclusive of the patulous spines, which are ¼ in. long.—Open forests of the province of Imerina, *Baron* 620! 1848! Two species of this genus are known at the Cape, and one in Abyssinia.

TROCHETIA PENTAGLOSSA, n. sp.

Arborea, ramulis crassis, foliis magnis breviter petiolatis obovato-oblongis integris coriaceis facie lucidis dorso ad axillas nervorum solum pilosis, floribus solitariis breviter pedunculatis, sepalis lanceolatis sericeis, petalis oblongis obtusis quam calyx paulo brevioribus, staminibus quam petala duplo brevioribus, antheris fertilibus 15 filamentis brevibus obscure connatis, staminodiis lanceolatis, ovario piloso stigmatibus 5 magnis lingulatis.

A tree, with thick ultimate branchlets, silky towards their tips. Petiole $\frac{1}{4}$–$\frac{1}{3}$ in.; blade 5–6 in. long, 2–3 in. broad at the middle, subobtuse, narrowed from the middle to a rounded base, the 10–12-jugate strongly raised erecto-patent main veins with tufts of brown hairs in their axils on the under surface. Branchlets in the specimens terminated by a pilose leafy bud, from the base of which springs a single densely pilose peduncle under $\frac{1}{2}$ in. long. Sepals 5, acute, coriaceous, an inch long, densely brown-silky on the back. Petals purplish brown, oblong, obtuse, $\frac{1}{3}$ in. broad, slightly silky outside. Anthers linear, $\frac{1}{3}$ in. long, with short flattened filaments; staminodia lanceolate, petaloid, brownish black, as long as the anthers. Ovary globose, densely pilose; styles very short, pilose like the ovary; stigmas ascending, lingulate, $\frac{1}{6}$ in. long.—Central Madagascar, *Dr. Lyall* 223!

MELHANIA LAURIFOLIA, *Bojer in Ann. Sc. Nat.* ser. 2, xviii. 192.

Arborea, ramulis lepidotis, foliis coriaceis integris obovato-oblongis obtusis, cymis compositis laxifloris pedunculatis, bracteolis nullis, sepalis parvis lanceolatis lepidotis, petalis deltoideo-cuneatis scariosis persistentibus, columna staminea brevissima, ovario globoso triloculari, stylis subulatis falcatis.

A tree 30–40 feet high, with angled slender woody branchlets, coated with brown scales. Petiole $\frac{1}{4}$–$\frac{1}{3}$ in.; blade 2–4 in. long, 1–1$\frac{1}{4}$ in. broad, narrowed from the middle to a rounded base, obscurely lepidote on both sides, but not at all pilose, the fine main veins anastomosing in arches near the margin. Cymes lax, few-flowered, with long slender lepidote peduncles; pedicels sometimes $\frac{1}{2}$ in. long. Sepals 5, coriaceous, lanceolate, acute, $\frac{1}{8}$ in. long, also lepidote. Petals twice as long as the sepals, $\frac{1}{6}$ in. broad, unsymmetrical, finally brown and scariose. Staminodes 5, erect, incurved, linear, $\frac{1}{12}$ in. long, with a single fertile stamen between each, with a flattened free filament as long as the suborbicular anther. Ovary globose, sessile, lepidote like the calyx &c., with 3 falcate subulate styles as long as the ovary connate at the base.—Woods of the province of Imerina, gathered long ago by Bojer, and now sent by Baron (1325!) from the forest of Andrangaloaka by Dr. Parker. This is such a peculiar member of the genus that I have thought it worth while to redescribe it in detail, as the only published account of it is very brief.

RULINGIA MADAGASCARIENSIS, n. sp.

R. ramulis tomentosis, foliis oblongis integris planis facie tenuiter dorso dense incanis, cymis densifloris pedunculatis, calycis tubo brevi segmentis ovatis, petalorum ligulis linearibus quam calyx paulo longioribus, capsulis magnis depresso-globosis setis elongatis hispido-plumosis densissime vestitis.

A forest shrub, 8–10 feet high, with slender terete woody tomentose branchlets. Petiole $\frac{1}{8}$–$\frac{1}{6}$ in., with a pair of small linear caducous stipules; blade subcoriaceous, 1–1$\frac{1}{2}$ in. long, acute, unequal-sided at the base, not at all rugose or bullate, dull green and thinly tomentose above, matted with a thin close coat of whitish tomentum beneath. Cymes dense, terminal, and opposite the upper leaves, shortly peduncled; pedicels as long as the flowers; bracts lanceolate. Calyx campanulate, dull red, $\frac{1}{6}$ in. long, with a short tube and 5 ovate segments. Petals whitish, with a broad cucullate base and strap-shaped limb just protruded beyond the calyx. Staminodia 5, lanceolate, spreading, pilose, half as long as the calyx; 5 antheriferous stamens shorter, reflexing so that the quadrate 4-lobed anthers are thrust against the dilated cucullate base of the petals; free filament twice as long as the anther. Capsule depresso-globose, an inch in diameter, densely beset with spreading intertangled plumose subulate processes, 5-celled, opening at the top, the carpels not separating. —Central Madagascar, gathered long ago by Bojer and Meller; *Baron* 383! Forest of Andrangaloaka, *Dr. Parker*! All the other species of the genus, about 15 in number, are natives of Australia.

GREWIA LANCEOLATA, n. sp.

Fruticosa, ramulis gracillimis hispidis, foliis lanceolatis acuminatis brevissime petiolatis utrinque viridibus glabris, cymis 3–4-floris axillaribus breviter pedunculatis, pedicellis calyci æquilongis, sepalis parvis lanceolatis dorso hispidis facie brunneis, petalis nullis, staminibus quam calyx triplo brevioribus, stylo filiformi ovario globoso æquilongo.

A shrub, with very slender hispid terete branchlets. Leaves alternate; petiole very short; blade 4–6 in. long, about $\frac{1}{2}$ in. broad, acuminate, moderately firm in texture, bright green on both surfaces, with only a few very minute obscure scales, the main veins distant and anastomosing by distinct arches just within the margin. Flowers in shortly peduncled umbels in the axils of the leaves. Calyx $\frac{1}{8}$ in. long; sepals 5, lanceolate, grey and tomentose outside, brown and petaloid on the face. Petals entirely absent. Stamens about 12, with filiform filaments and orbicular anthers. Ovary densely pilose; style filiform, exceeding the stamens. Fruit unknown.—Between Tankay and the east coast, *Baron* 1530!

GREWIA (§ VINCENTIA) POLYPYRENA, n. sp.

G. ramulis pilosis, foliis petiolatis oblongis acutis subcoriaceis subglabris denticulatis basi obliquis, cymis axillaribus 1–2nis 2–3-floris breviter pedunculatis, pedicellis flori æquilongis, sepalis ligulatis dorso hispidis, petalis lanceolatis quam calyx duplo brevioribus, staminibus petalis æquilongis, ovario triloculari ovulis in loculo pluribus, fructibus siccis scabris oblongis pyrenis monospermis sæpe 6–12.

A tree, with slender terete woody branchlets densely pilose towards the tip. Petioles $\frac{1}{3}$–$\frac{1}{2}$ in., densely pilose; blade subcoriaceous, $1\frac{1}{2}$–2 in. long, about an inch broad, unequally rounded at the base, narrowed gradually to the point, minutely dentate, bright green on the upper surface, pale green beneath, obscurely pubescent, the main veins erecto-patent, those that spring from the base of the midrib produced to the edge of the leaf at its middle. Cymes copious, axillary, the peduncles and pedicels both about $\frac{1}{2}$ in. long, densely pilose. Sepals strap-shaped, $\frac{1}{3}$ in. long, purplish brown on the face, densely hispid on the back. Petals oblanceolate, half as long as the sepals. Stamens very numerous, as long as the petals. Ovary ovoid, pilose, 3-celled, with several superposed ovules in a cell; style filiform, $\frac{1}{6}$–$\frac{1}{5}$ in. long, with 3 subulate stigmas. Fruit dry, brown, oblong, simple, rugose, under $\frac{1}{2}$ in. long, containing often as many as 6-12 bony one-seeded pyrenes.—Central Madagascar, *Lyall* 388! *Baron* 573! 942! Closely allied to *Vincentia triflora*, Bojer in Hook. Bot. Misc. i. 293, tab. 62.

ELÆOCARPUS SUBSERRATUS, n. sp.

Arboreus, foliis longe petiolatis oblongis acutis serratis subcoriaceis utrinque viridibus glabris, floribus in racemos paucifloros breves axillares dispositis, pedicellis cernuis flori æquilongis, calycis subsericei segmentis lanceolatis, petalis oblanceolatis calyci æquilongis apice serratis, staminibus obscure pilosis, antheris haud apiculatis.

A tree, with the tips of the woody branchlets silky. Petiole glabrous, an inch or more long; blade 5–6 in. long, 2 in. broad, acuminate, distinctly serrated, rounded at the base, silky when young, green and glabrous when mature on both surfaces, with few much ascending distinct main veins. Racemes numerous, axillary, few-flowered, not much longer than the petioles; rhachis and pedicels silky. Calyx $\frac{1}{4}$ in. long, slightly silky, cut down nearly to the base. Petals whitish, oblanceolate, silky, scarcely longer than the calyx. Stamens about 20, half as long as the calyx, obscurely silky; anthers about $\frac{1}{12}$ in. long. Ovary silky, globose; style short.—Central Madagascar, *Baron*! A near ally of *E. serratus*, L., which is planted in Mauritius and has been gathered in Madagascar by Curtis.

ELÆOCARPUS SERICEUS, n. sp.

E. ramulis sericeis, foliis petiolatis oblongis acutis subcoriaceis denticulatis facie glabris dorso sericeis, floribus hermaphroditis pentameris laxe racemosis, pedicellis cernuis flori æquilongis, sepalis lanceolatis brunneis dense sericeis, petalis oblanceolatis apice fimbriatis quam calyx paulo longioribus, staminibus 10 quam petala duplo brevioribus, antheris lineari-oblongis apice emarginatis, ovario globoso 2-loculari, stylo ovario æquilongo.

A large forest-tree, with woody branchlets, silky towards the tip. Petiole above an inch long; blade subcoriaceous, 2–4 in. long, about an inch broad, acuminate, deltoid at the base, obscurely toothed, bright green and glabrous above, covered with persistent beautiful bright brown silky tomentum beneath. Flowers in copious lax racemes 2–3 in. long, with a silky rhachis and silky cernuous pedicels as long as the flowers. Sepals 5, lanceolate, acute, $\frac{1}{6}$ in. long, densely silky on the outside. Petals oblanceolate, rather longer than the sepals, silky outside, cut at the tip into five or six short lobes. Stamens half as long as the petals; emarginate erect linear-oblong anthers twice as long as the filaments. Ovary globose, densely pilose, 2-celled. Fruit not seen.—Forests of Central Madagascar. We had leaves several years ago from Mrs. Pool and Miss Gilpin, and were quite puzzled with it; and now Mr. Baron has sent it in flower (1038! 1066!)

ELÆOCARPUS RUFOVESTITUS, n. sp.

Arboreus, ramulis ferrugineo-tomentosis, foliis parvis breviter petiolatis oblongis obtusis integris rigidis facie viridibus subcalvatis dorso persistenter ferrugineo-tomentosis, floribus in racemos axillares dispositis, pedicellis cernuis flori æquilongis, calycis ferrugineo-tomentosi segmentis lanceolatis, petalis pallidis calyci æquilongis apice dentatis, staminibus circiter 20, antheris acutis.

A tree 20 or 30 feet high, with terete branchlets, clothed upwards with ferruginous tomentum. Petiole very short; blade 1½–2 in. long, under an inch broad, rounded at both ends, dull green above, densely coated beneath with bright reddish-brown persistent tomentum. Flowers in copious nearly sessile axillary racemes 1½–2 in. long; rhachis and pedicels, like the calyx, densely ferrugineo-tomentose. Calyx ⅙ in. long, cut down nearly to the base. Petals pale, oblanceolate, obtuse, not longer than the calyx, densely silky on the outside, only faintly toothed at the tip. Stamens half as long as the corolla, pilose; anthers oblong, acute, but not distinctly apiculate. Fruit yellow, ovoid, under an inch long.—Open forests of the province of Imerina, *Baron* 1253! 1313! 1710! Forest of Andrangaloaka, *Dr. Parker*!

ELÆOCARPUS ALNIFOLIUS, n. sp.

E. ramulis foliisque glaberrimis, foliis parvis petiolatis oblongis serratis, floribus hermaphroditis tetrameris laxe racemosis, pedicellis cernuis flori subæquilongis, sepalis lanceolatis brunneis sericeis, petalis oblanceolatis calyci æquilongis apice fimbriatis, staminibus circiter 12, antheris parvis lineari-oblongis apice emarginatis, fructibus parvis oblongis 1-loculatis monospermis.

A forest-tree, 30–40 feet high, with slender woody perfectly glabrous branchlets. Leaves crowded; petiole ⅓–½ in.; blade subcoriaceous, 1–1½ in. long, deltoid at the base, narrowed gradually to an obtuse point, green and glabrous on both surfaces, with distant parallel conspicuous erecto-patent main veins. Flowers in copious lax racemes 1–1½ in. long; pedicels cernuous, silky, as long as the flowers. Sepals lanceolate, thinly silky, ⅙ in. long. Petals oblanceolate, pilose, just as long as the calyx, lobed at the tip. Stamens about 12, half as long as the calyx, the free filament shorter than the emarginate linear-oblong pilose anther. Ovary ovoid, with a subulate style. Fruit oblong, green, ½ in. long, resembling an unripe sloe, with a thick bony 1-celled endocarp, containing only a single seed.—Forest of Andrangaloaka, *Dr. Parker*!

ELÆOCARPUS RHODANTHUS, n. sp.

Arboreus, glaber, foliis petiolatis obovato-oblongis obtusis integris subcoriaceis, floribus solitariis axillaribus, pedunculis flori æquilongis, calycis incani segmentis lanceolatis acutis, petalis deltoideis saturate rubris apice laciniatis, staminibus permultis, antheris longe apiculatis.

A tree, glabrous in all its parts, with short terete woody branchlets. Petiole ½–¾ in.; blade 2–4 in. long, 1½–2 in. broad, obtuse, sometimes emarginate at the apex, rounded at the base, bright green and glabrous on both surfaces, with 5-6-jugate distinct erecto-patent main veins. Flowers solitary from the axils of the upper leaves on ascending peduncles an inch long. Calyx just like that of *E. quercifolius.* Petals bright red, an inch long and nearly as broad, 2-lobed, and acutely serrated on the top. Stamens 50 or more, as long as the calyx; anthers densely pilose, with an apiculus a line long. Ovary ampullæform, densely pilose, narrowed gradually into the entire style.—Central Madagascar, *Baron* 1928!

ELÆOCARPUS QUERCIFOLIUS, n. sp.

Arboreus, glabra, foliis distincte petiolatis oblanceolato-oblongis subacutis repandis subcoriaceis utrinque viridibus glabris, floribus solitariis axillaribus, pedunculis cernuis flori æquilongis, calycis incani segmentis lanceolatis acutis, petalis deltoideis saturate rubris profunde laciniatis quam calyx duplo longioribus, staminibus permultis, antheris longe apiculatis.

A tree, glabrous in all its parts, with slender terete branchlets. Petiole ½–1 in.; blade 2–3 in. long, 1 in. broad, subacute, narrowed gradually from the middle to the base, broadly repand, subcoriaceous, bright green and glabrous on both surfaces, with 4–5-jugate distinct erecto-patent main veins. Flowers solitary from the axils of the upper leaves, on glabrous slender cernuous peduncles an inch long. Calyx ½ in. long, coriaceous, brownish, thinly silky, cut down nearly to the base into 5 lanceolate acute segments. Petals bright red, cut down to the middle into three serrated lobes, twice as long as the calyx. Stamens 50 or more, ½ in. long, densely pilose, with an apiculus a line long to the anther. Ovary globose, densely pilose.—Central Madagascar, *Baron* 1954!

ELÆOCARPUS DASYANDRUS, n. sp.

E. ramulis pubescentibus, foliis petiolatis oblongis subcoriaceis obtusis denticulatis utrinque glabris, floribus magnis solitariis pentameris hermaphroditis pedunculatis, sepalis ovato-lanceolatis basi connatis, petalis deltoideo-cuneatis calyce longioribus apice lobatis utrinque pilosis, staminibus permultis, antheris dense pilosis longe apiculatis, ovario ovoideo dense piloso.

A tree, with the leaves crowded at the tip of the stoutish ultimate branchlets. Petiole under ½ in. long; blade 1¼–1½ in. long, subcoriaceous, rounded at the base, green on both surfaces, with 5–6 pairs of arcuate parallel distinctly marked main veins. Flowers single from the axils of the leaves on pubescent peduncles an inch long. Calyx coriaceous, $\frac{1}{2}$ in. long, densely pubescent on the outside, with a short tube and 5 ovate-lanceolate segments. Petals rather longer than the calyx, nearly half an inch broad, much imbricated, brownish pilose on both sides, with several orbicular lobes at the tip. Stamens very numerous, half as long as the petals, with short filaments and densely pilose sausage-shaped anthers, narrowed into a long tip. Ovary ovoid, densely pilose, with a short style. Fruit not seen.—Central Madagascar, *Baron* 708!

ERYTHROXYLUM GERRARDI, n. sp.

Glabrum, ramulis apice applanatis, foliis parvis rigidis obovatis obtusis brevissime petiolatis venulis immersis, pedicellis solitariis quam flos 2–3plo longioribus, calycis segmentis deltoideis, petalis oblongis quam calyx triplo longioribus basi ligula magna rugosa appendiculatis, urceolo stamineo calyci æquilongo, stylis subulatis basi coalitis.

An erect shrub, 6 feet high, glabrous in all its parts, the slender branchlets flattened towards the tip. Leaves alternate, very shortly petioled, rigidly coriaceous, an inch long, the veins of the under surface except the midrib quite hidden. Flowers usually solitary, on short erecto-patent pedicels. Calyx $\frac{1}{2}$ line long, cut down nearly to the base into 5 deltoid segments. Petals oblong, reddish, $\frac{1}{8}$ in. long, with a rugose ligule half as long as the lamina, with a deflexed tip. Stamens nearly as long as the petals. Ovary globose, 3-celled; styles free more than halfway down.—Madagascar, *Gerrard* 29! A near ally of *E. jossinioides*, Bojer in Ann. Sc. Nat. sér. 2. xviii. tom. 184.

ERYTHROXYLUM PYRIFOLIUM, n. sp.

Glabrum, ramulis sursum applanatis, foliis obovato-oblongis obtusis basi deltoideis venis subtilibus, pedicellis sæpissime solitariis quam flos 3–4plo longioribus, calycis segmentis deltoideis, petalis oblongis quam calyx 3–4plo longioribus ligula magna basi appendiculatis, urceolo stamineo quam calyx longiore, stylis ad basin liberis.

An erect shrub, glabrous in all its parts, with branchlets flattened towards the tips. Leaves alternate, shortly petioled, 2–3 in. long, 1–1$\frac{1}{2}$ in. broad, obtuse, deltoid at the base, less rigid in texture than in *E. nitidulum*, the veinlets fine and not raised. Flowers usually solitary, on straight erecto-patent pedicels $\frac{1}{4}$–$\frac{1}{3}$ in. long. Calyx $\frac{1}{2}$ line long, cut down nearly to the base into 5 deltoid segments. Petals oblong, $\frac{1}{8}$ in. long, with a ligule adnate more than halfway up, with a deflexed orbicular tongue. Stamens nearly as long as the petals. Ovary globose, 3-celled; styles free to the base.—East coast of Madagascar, *Baron* 1518! Closely allied to the Mauritian *E. laurifolium*, Lam.

ERYTHROXYLUM NITIDULUM, n. sp.

Glabrum, ramulis apice ancipitibus, foliis parvis oblongis obtusis basi cuneatis subcoriaceis subtus pulchre venulosis, floribus axillaribus 1–4nis, pedicellis strictis quam flos 3–4plo longioribus, calycis segmentis deltoideis, petalis oblongis quam calyx 3–4plo longioribus ligula magna basi appendiculatis, urceolo stamineo quam calyx longiore, stylis infra apicem coalitis.

An erect shrub, glabrous in all its parts, the slender branchlets ancipitous towards the tips. Petiole $\frac{1}{8}$–$\frac{1}{4}$ in.; blade rigidly coriaceous, $1\frac{1}{2}$–2 in. long, obtuse, deltoid at the base, shining beneath, with all the veins and veinlets raised. Flowers 1–4-nate from the axils of the leaves; pedicels glabrous, $\frac{1}{4}$–$\frac{1}{3}$ in. long; bracts minute, deltoid. Calyx $\frac{1}{2}$ line long, cut down nearly to the base into 5 deltoid segments. Petals oblong, $\frac{1}{8}$ in. long, red on the outside, with an acuate scale half as long as the lamina. Stamens nearly as long as the petals; staminal urceolus longer than the calyx, distinctly toothed. Ovary globose, 3-celled; style as long as the ovary, tricuspidate only at the tip.—Central Madagascar, *Baron* 1936! 1944!

SPHENDAMNOCARPUS MADAGASCARIENSIS, *Baker*.—Banisteria multiflora, *Bojer MSS.*; *A. Juss. in Archiv. Mus.* iii. 424; *Walp. Rep.* v. 246.

Scandens, ferrugineo-tomentosus, foliis ovatis acutis dorso persistenter tomentosis, petiolis elongatis glandulis 2 patellæformibus præditis, paniculæ ramis umbellatis, umbellis 3–4-floris, pedicellis flore longioribus, calycis segmentis 5 deltoideis tubo campanulato æquilongis, petalis calyce sesquilongioribus, staminibus quam calyx paulo longioribus, stylis 3 brevibus erectis, samaræ ala dorsali magna oblanceolato-oblonga.

A woody climber, with terete branchlets, clothed with persistent ferruginous tomentum. Leaves opposite; petiole $\frac{1}{2}$–1 in. long, with two large black glands near the top; blade 2–3 in. long, subcoriaceous, acute, rounded at the base, finally green and glabrous above, clothed with persistent ferruginous tomentum below, with 5–6 pairs of distinct parallel ascending main veins. Flowers in terminal panicles, the peduncled umbels bracteated by reduced leaves at the base. Pedicels $\frac{1}{4}$–$\frac{1}{2}$ in. long. Calyx $\frac{1}{12}$ in. long, tomentose, destitute of glands. Petals obovate, $\frac{1}{8}$ in. long, obscurely unguiculate, entire. Stamens 10, a little longer than the calyx; filaments flat, twice as long as the oblong anthers. Style not more than ½ line long, straight, with an oblique capitate stigma. Fruit of three samaræ, with no trace of any wing but the dorsal one, which is rather curved and an inch long.—Bonatuc Bay, *Bojer*! Central Madagascar, *Baron* 721!

MICROSTEIRA, genus novum Malpighiacearum.
(Tab. XXIII. figg. 1–8.)

Flores abortu polygamo-dioici. Calyx parvus, 5-partitus, eglandulosus, segmentis oblongo-lanceolatis. Petala 5, oblonga, integra, obscure unguiculata. Flores masculi—stamina 10, omnia perfecta, petalis paulo breviora, filamentis filiformibus glabris, antheris oblongis. Flores fœminei—stamina rudimentaria producta; ovarium triquetrum, triloculare, stylis brevibus filiformibus curvatis divaricatis apice stigmatoso dilatatis. Carpella fructifera 3, samaroidea, ab axi secedentia, alis 3 oblanceolato-oblongis coriaceis glabris venosis, dorsali patula minore, lateralibus ascendentibus majoribus.—Frutex volubilis Madagascariensis, ramulis apice ferrugineo-pilosis, foliis oppositis petiolatis membranaceis, floribus in umbellas copiosas laterales pedunculatas dispositis.

M. CURTISII, *Baker*.

A forest-climber, with stems 30 feet long, with terete scabrous slender branchlets, ferrugineo-pilose only at the young tips. Leaves opposite, contemporary with the flowers, exstipulate; petiole eglandular, ferrugineo-pilose; blade oblong, acute, rounded at the base, 2–3 in. long, about an inch broad, green and glabrous on both sides when mature, ferrugineo-pilose in a young state. Flowers in very copious umbels on short erecto-patent ferrugineo-pilose peduncles, 8–10 to an umbel; pedicels straight, ascending, ¼–⅓ in. long, without any bracteoles, the basal bracts minute, deltoid. Calyx under a line long, densely ferrugineo-pilose. Petals pure white, oblong, over ¼ in. long, obtuse, obscurely and unequally unguiculate. Male flowers without any perceptible ovary, the ten stamens nearly all perfect and not much shorter than the petals. Ovary in the female flower hispid, 3-lobed, with three divaricating styles about half a line long, capitate at the oblique stigmatose tip. Fruit-carpels glabrous, with two glossy green oblanceolate-oblong obtuse ascending side-wings about half an inch long, and a much smaller one of the same shape on the back.

This is a well-marked new genus of the tribe Hireæ. It was first gathered by Mr. Curtis, who travelled in the island on behalf of Messrs. Veitch; but his specimen had only the male flowers, so that we could not detect its affinities. Now Mr. Baron has sent excellent examples (1714! 2060!) showing it in all the three states—male flowers, female flowers, and mature fruit.

OXALIS XIPHOPHYLLA, n. sp.

Herbacea, acaulis, petiolis elongatis gracillimis, foliis digitatim trifoliolatis, foliolis lineari-oblongis integris parce ciliatis, pedunculis folio subæquilongis, umbellis 5–6-floris, pedicellis elongatis, calycis segmentis oblongo-lanceolatis glabris acutis, petalis albis quam calyx 2–3plo longioribus, filamentis pilosis basi monadelphis calyce longioribus.

An acaulescent herb, half a foot high, with very slender long petioles. Leaflets membranous, an inch long, $\frac{1}{6}$ in. broad, obtuse, green above, glaucous beneath, with a few long fine hairs on the midrib and margin. Peduncles very slender, half a foot long. Pedicels very slender, $\frac{1}{2}$ in. long, with a whorl of minute lanceolate bracts at the base. Sepals glabrous, $\frac{1}{6}$ in. long, green, with a reddish tip. Petals under $\frac{1}{2}$ in. long. Stamens just longer than the calyx, the pilose filaments united in a basal cup.—Central Madagascar, *Baron* 2132! This belongs to the same group as *O. variabilis* and *O. corymbosa*.

OXALIS VILLOSA, n. sp.

Herbacea, acaulis, dense persistenter villosa, petiolo quam folium longiore, foliis digitatim trifoliolatis, foliolis obovato-cuneatis integris, pedunculis folio subæquilongis, umbellis 6–8-floris, pedicellis brevibus dense pilosis, calycis segmentis oblongis obtusis, petalis albidis quam calyx triplo longioribus, staminibus pilosis basi monadelphis.

An acaulescent herb, 2–3 in. high, with a slender cylindrical root; the whole plant densely clothed with short whitish pubescence. Leaves four or five to a rosette; petiole $\frac{1}{2}$–1 in. long, densely villose; leaflets 3, sessile, entire, $\frac{1}{2}$–$\frac{3}{4}$ in. long and broad, green and thinly coated with shining white hairs above, thickly matted with similar hairs beneath. Peduncles 2–3 to a rosette, about as long as the leaves, petiole included. Pedicels $\frac{1}{4}$–$\frac{1}{3}$ in. long, with a whorl of minute lanceolate bracts at the base. Calyx $\frac{1}{8}$ in. long. Petals obovate, $\frac{1}{3}$ in. long. Stamens $\frac{1}{8}$ in. long, the densely pilose filaments united in a tube at the base.—Central Madagascar, *Baron* 1801! Allied to the Cape *O. sericea*, L.

OXALIS SIMULANS, n. sp.

Herbacea, perennis, caulescens, breviter pubescens, foliis digitatim tri-

foliolatis, foliolis deltoideis emarginatis, umbellis multis axillaribus 2–4-floris, pedunculis pedicellisque elongatis, calycis segmentis lanceolatis acutis, petalis pallide luteis quam calyx duplo longioribus, fructu cylindrico.

An erect perennial herb, with a fusiform root; the whole plant clothed with short persistent fine whitish pubescence. Stems slender, densely cæspitose, erect, ½–1 ft. long. Petioles 1–2 in. long; leaflets membranous, ½–¾ in. long and broad, deeply emarginate, with two semiorbicular apical lobes. Peduncles 2–3 in. long; pedicels ½–¾ in. long, with a whorl of lanceolate bracts at the base. Calyx ⅙ in. long. Capsule cylindrical, an inch long, with 5 short hooked styles.—Central Madagascar, *Dr. Parker*! *Baron* 2110! So like *O. stricta*, that I thought at first it was a hairy variety; but Mr. Baron's specimens just received show that it has a stout fusiform perennial rootstock.

IMPATIENS LYALLII, n. sp.

Suffruticosa, ramulis flexuosis ferrugineo-pilosis, foliis magnis petiolatis oblanceolato-oblongis membranaceis crenatis setoso-ciliatis petiolo piloso, floribus solitariis axillaribus longe pedunculatis, sepalis lateralibus parvis lanceolatis, posteriore piloso deltoideo-naviculari cuspidato calcari subulato 15–18 lin. longo, petalis rubellis magnis suborbiculatis, ovario ad basin et apicem angustato.

A shrub 3–6 feet high, with stoutish flexuose herbaceous branchlets, clothed with short ferruginous pubescence. Petiole pilose, 1–1½ in. long, not ciliated with any large glands; blade reaching a length of half a foot, 1–1½ in. broad above the middle, acute, narrowed gradually from the middle to the base, crenate, with a glandular bristle in each sinus, membranous, green and hispidulous on the upper surface, slightly ferruginous on the main veins beneath. Flowers solitary from the axils of the upper leaves on very slender ascending peduncles 2–3½ in. long. Lateral sepals lanceolate, ⅙ in. long; basal sepal with a cuspidate deltoid-navicular hood-like lamina half an inch long, greenish brown and finely pilose outside, and a simple filiform spur 1¼–1½ in. long. Petals pinkish, orbicular, not lobed, nearly an inch long and broad. Fruit oblong, glabrous, nearly an inch long, narrowed gradually both to base and apex.—Central Madagascar, sent long ago by Dr. Lyall as "49. *Balsamina glandulifera*." Gathered in 1862 by Dr. Meller in the forest of Befarona; and now Mr. Baron and Dr. Parker both send excellent specimens, the first as No. 1242, and the latter from the forest of Andrangaloaka. It is one of the finest species of the whole genus, and would be very suitable to introduce for horticultural purposes. It is allied to a Comoro-Island plant, named long ago by Bojer, but, I believe, never characterized, of which I therefore give a description.

IMPATIENS COMORENSIS, n. sp.—Balsamina comorensis, *Bojer MSS.*

Suffruticosa glabra, ramulis crassiusculis flexuosis, foliis oblongis membranaceis acutis basi cuneatis crenatis setoso-ciliatis, petiolo glandulis magnis clavatis 3–4-jugis prædito, floribus axillaribus 3–4nis longe pedunculatis, sepalis lateralibus parvis oblongis cuspidatis, posteriore naviculari calcari profunde bifido 15–18 lin. longo, petalis magnis orbiculatis rubellis haud lobatis, ovario ad basin et apicem angustato.

A shrub 3–4 feet high, with stoutish flexuose glabrous herbaceous branchlets. Petioles 1–1½ in. long, often bulbilliferous in the axil, margined by 3–4 pairs of large clavate glands; blade 3–4 in. long, 1½–2 in. broad, crenate, with a glandular bristle in each sinus, green and quite glabrous on both surfaces. Flowers 3–4 together in the axils of the upper leaves on very slender ascending peduncles 3–4 in. long. Lateral sepals oblong cuspidate, ¼–⅓ in. long; posterior sepal with a deltoid funnel-shaped limb about half an inch long, and a deeply bifid filiform spur 15–18 lines long. Petals pinkish, an inch long, not lobed. Ovary narrowed gradually from the middle to the base and point. —"In locis obscuris insulæ Juannæ;" gathered and distributed long ago by Bojer. We have also specimens gathered in 1862 by Sir John Kirk, and in 1875 (No. 1575) by Dr. J. M. Hildebrandt. There appear to be two other species in the island; but our material is not good enough to characterize either of them fully.

IMPATIENS FIRMULA, n. sp.

Suffruticosa glabra, foliis breviter petiolatis oblongis acutis firmulis glanduloso-serratis, floribus axillaribus solitariis longe pedunculatis, sepalis lateralibus parvis lanceolatis, posteriore lamina deltoideo-naviculari calcari subulato pollicari vel ultra, petalis parvis rubellis, ovario oblongo utrinque attenuato.

A branched undershrub, glabrous in all its parts, with slender firm ultimate branchlets. Petiole ¼–½ in. long, sometimes (but not always) margined with two or three large clavate glands; blade 1½–3 in. long, ¾–1 in. broad at the middle, narrowed to both ends, firm in texture for the genus, sometimes tinted purple, finely serrated, with a bristle in each sinus. Flowers solitary in the axils of the upper leaves, on slender ascending peduncles 1–2 in. long. Lateral sepals minute, lanceolate; posterior sepal with a deltoid-navicular lamina $\frac{1}{4}$–$\frac{1}{3}$ in. long and broad, and a simple subulate spur 1–1$\frac{1}{4}$ in. long. Petals reddish, the wings not more than $\frac{1}{2}$ in. long and broad, not deeply lobed. Capsule $\frac{1}{2}$ in. long, narrowed to both ends.—Central Madagascar; gathered long ago by Bojer and distributed as *Impatiens capensis*, and by Lyall (no. 50). Sent lately by Mr. Baron and by Dr. Parker from the forest of Andrangaloaka. I presume it is *I. leptopoda*, var. *madagascariensis* of O. Hoffm. in Rel. Ruten. v. 335; but the Ceylon plant is a flaccid annual herb, and this is a perennial with woody lower branches.

IMPATIENS SALICIFOLIA, n. sp.—Balsamina salicifolia, *Bojer MSS.*

Herbacea, glabra, foliis subsessilibus linearibus firmulis calloso-dentatis, floribus axillaribus 1–2nis longe pedunculatis, sepalis lateralibus oblongis acutis, posteriore limbo deltoideo-naviculari calcari subulato pollicari, petalis magnis latis rubellis haud lobatis, fructu oblongo ad apicem et basin angustato.

An erect herb, glabrous in all its parts, with stout herbaceous erect little-branched stems. Leaves close, subsessile, erecto-patent, firm in texture for the genus, 3–4 in. long, $\frac{1}{4}$–$\frac{1}{3}$ in. broad, narrowed gradually to the base and acute point, green on both surfaces, with a horny edge and a callus at the tip of the minute teeth. Flowers 1–2 together from the axils of the upper leaves on slender ascending peduncles 2–3 in. long. Lateral sepals greenish, $\frac{1}{4}$ in. long; posterior sepal with a deltoid-navicular lamina $\frac{1}{2}$ in. long, narrowed gradually into the subulate spur. Petals reddish, the wings nearly an inch long. Capsule oblong, $\frac{3}{4}$ in. long, narrowed from the middle to the base and tip.—Central Madagascar; gathered long ago by Bojer and distributed under the name of *Balsamina salicifolia*, and now refound by Mr. Baron (nos. 624 and 961). A closely allied species from the Ankaratra mountains has lately been described by Dr. O. Hoffmann (Reliq. Ruten. part v. p. 335) under the name of *Impatiens Rutenbergii.*

IMPATIENS EMIRNENSIS, n. sp.

Herbacea, glabra, ramis gracilibus fragilibus, foliis oblongis acutis membranaceis crenatis setoso-denticulatis, petiolo glandulis magnis clavatis prædito, floribus in axillis foliorum 3–5nis umbellatis, sepalis lateralibus

lanceolatis, posteriore limbo parvo naviculari calcari subulato semipollicari, petalis latis rubellis magnitudine mediocribus haud lobatis, ovario oblongo utrinque angustato.

An annual herb, with long slender fragile glabrous stramineous branches. Leaves distant, alternate; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. long, margined with 2–3 pairs of large clavate glands; blade very membranous, 3–4 in. long, 1–1$\frac{1}{2}$ in. broad at the middle, narrowed gradually to the base and acute point, with a few inconspicuous bristles on the upper surface, minutely crenate, with a small bristle in each sinus. Flowers umbelled in the axils of several of the upper leaves, the slender peduncles not more than an inch long. Lateral sepals oblong-cuspidate, membranous, glabrous, $\frac{1}{8}$–$\frac{1}{6}$ in. long; posterior sepal with a navicular lamina $\frac{1}{6}$ in. long and broad, and a spur half an inch long. Petals reddish, the side ones $\frac{1}{2}$ in. long and broad. Ovary oblong, narrowed to the base and tip.—Central Madagascar, in forests of the province of Imerina, *Bojer*! *Lyall* 51! *Baron* 744! Easily recognized from the other Madagascar species by its umbelled flowers.

IMPATIENS TRICHOCERAS, n. sp.

Herbacea, ramulis gracilibus fragilibus apice ferrugineo-pilosis, foliis petiolatis oblongis acutis membranaceis crenatis setoso-ciliatis, petiolo haud glanduloso, floribus axillaribus 1–2nis longe pedunculatis, sepalis pilosis lateralibus lanceolatis, posteriore lamina deltoideo-naviculari calcari subulato 12–15 lin. longo, petalis parvis latis rubellis, ovario utrinque attenuato.

A flaccid herb, with very slender fragile branches ferrugineo-pilose towards the tip. Leaves distant, alternate; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. long, without any large clavate glands; blade 1$\frac{1}{2}$–2 in. long, $\frac{3}{4}$–1 in. broad, acute, cuneate at the base, membranous, dark green, crenate, with a glandular bristle in each sinus. Flowers 1–2 together from the axils of the upper leaves, on slender ascending pilose peduncles 1–1$\frac{1}{2}$ in. long. Lateral sepals lanceolate, $\frac{1}{6}$ in. long; posterior sepal pilose, with a deltoid-navicular lamina $\frac{1}{4}$–$\frac{1}{3}$ in. long, and a subulate pilose spur 1–1$\frac{1}{4}$ in. long. Petals reddish, the wings under $\frac{1}{2}$ in. long. Ovary narrowed from the middle to both ends.—Central Madagascar, *Lyall* 46! We have also two other Madagascar species gathered by Dr. Lyall, one a flaccid annual near *I. capensis*, Thunb., and the other a shrubby species near *I. firmula*; but of both the material is too incomplete to characterize them properly.

EVODIA DENSIFLORA, n. sp.

E. ramulis apice pilosis, foliis digitatim trifoliolatis, petiolo conspicue alato, foliolis obovato-cuneatis obtusis subcoriaceis glabris, floribus tetrameris in paniculas axillares densifloras breviter pedunculatas ramis corymbosis dispositis, pedicellis brevibus pilosis, calycis minuti segmentis rotundatis, petalis oblongis calyce 3–4plo longioribus, staminibus exsertis filamentis applanatis, ovario in flore masculo rudimentario.

A forest-tree, 20 or 30 feet high, with crowded branchlets, pilose towards the tip. Leaves opposite; petiole 1-1½ in. long, with a rigid wing $\frac{1}{12}$ in. broad at the top, narrowed gradually to the base; leaflets 1–2 in. long, obtuse, narrowed gradually from the middle to the base, subcoriaceous, drab-green and glabrous on both surfaces, minutely black-dotted beneath, the fine ascending main veins anastomosing by arches within the margin. Panicles dense, produced from the axils of the upper leaves, about as long as the leaves; peduncle and branches densely pilose; branches corymbose. Calyx ½ line long, with 4 rounded lobes. Petals oblong, ⅛ in. long. Stamens half as long again as the petals; anthers oblong, purple; filaments flattened, glabrous. Ovary globose, densely pilose. Fruit not seen.—Central Madagascar, in the forest of the province of Imerina, *Parker*! *Baron* 1925!

EVODIA CELASTRACEA, n. sp.

E. ramulis obscure pilosis, foliis oppositis simplicibus oblongis integris coriaceis glabris, paniculis axillaribus pedunculatis laxifloris ramis corymbosis, pedicellis flori æquilongis, calycis minuti segmentis 4 rotundis, petalis 4 oblongis quam calyx 3–4plo longioribus, staminibus petalis æquilongis filamentis applanatis, fructu 4-cocco semine nigro nitido.

A tree, with crowded slender erecto-patent obscurely pilose branchlets. Petiole ¼–½ in. long, articulated at the tip; blade always simple, 2-3 in. long, ½–¾ in. broad, obtuse, deltoid at the base, subcoriaceous, drab-green on both surfaces, distinctly black-dotted, with numerous ascending distinct main veins. Panicles about as long as the leaves, peduncled, with few corymbose branchlets; pedicels slender, about as long as the tetramerous flowers. Calyx ½ line long, pilose, with 4 semiorbicular segments. Petals oblong, ⅛ in. long. Stamens with oblong anthers and pilose flattened filaments. Fruit of 4 or fewer emarginate rigid cocci ⅓ in. broad, with a single black shining seed in each the size of a small pea.—Central Madagascar, *Baron* 1156! 1927!

Allied to *E. Chapelieri*, Baillon in Adansonia, x. 326, and *E. madagascariensis*, Baker in Trimen's Journ. 1882, p. 48.

TODDALIA (§ VEPRIS) SCHMIDELIOIDES, n. sp.

Inermis, ramulis pilosis, foliis trifoliolatis longe petiolatis, foliolis oblongis subcoriaceis obscure pilosis distincte petiolulatis, floribus polygamis in paniculas axillares dispositis, pedunculis pedicellisque pilosis, calycis segmentis 4 deltoideis, petalis 4 oblongis albidis, masculis staminibus perfectis 8 ovario parvo, fœmineis ovario globoso stigmate magno lobato, fructu globoso glabro intus glutinoso.

A tree, with slender densely pilose terete woody branchlets. Petiole 1½-2 in., densely pilose; leaflets 3, oblong, cuneate at the base, narrowed to an obtuse point, subcoriaceous, 3-4 in. long, 1-1½ in. broad at the middle, bright green and glabrous above, finely veined, obscurely pilose and gland-dotted beneath, the main veins anastomosing in intramarginal arches, the end leaflet with a pilose petiolule ½ in. long, and the side one with petiolules half as long. Flowers in copious axillary panicles much shorter than the leaves; peduncles and pedicels densely pilose, the latter as long as the flowers. Calyx ½ line long, densely pilose, with 4 deltoid segments. Petals 4, oblong, whitish, gland-dotted, ⅛ in. long. Male flowers with a rudimentary ovary and 8 perfect stamens, with suborbicular anthers shorter than the filaments. Female flower with a large globose ovary with a large capitate sessile lobed stigma and 8 rudimentary stamens. Fruit globose, glabrous, very glandular, ¼-⅓ in. in diam.—"In sylvis vastis Befouroun," *Bojer*, who distributed it as an *Ornitrophe*; and now regathered both in fruit and flower by Mr. Baron, no. 1102 and 1282.

CASSINOPSIS CILIATA, n. sp.

C. ramulis pilosis, foliis petiolatis oblongis acutis integris subcoriaceis primum ciliatis facie viridibus scabris dorso pilosis, floribus in paniculas axillares cymosas breviter pedunculatas dispositis, bracteis deltoideis, pedicellis brevissimis, calycis pilosi segmentis orbicularibus imbricatis, corollæ tubo brevi segmentis oblongis, filamentis brevissimis, ovario glabro, stylo subnullo, stigmate capitato.

A tree, with the habit of *Rhamnus Frangula*, with moderately stout woody densely pilose branches. Leaves opposite, with a pilose petiole ⅓-½ in. long; blade 3-4 in. long, oblong, acute, rounded at the base, 1½-2 in. broad, densely ciliated with a fringe of firm erecto-patent brown bristly hairs when young, dark green and scabrous above, paler, with 5–6-jugate raised ferrugineo-pilose arcuate-ascending main veins, beneath. Flowers in deltoid peduncled axillary cymes about an inch long. Calyx $\frac{1}{12}$ in. broad, with 5 orbicular obtuse pilose brown segments. Corolla $\frac{1}{6}$ in. long, with 5 spreading segments, connate in a short tube at the base. Stamens 5, inserted in the corolla-tube, with very short filaments and oblong anthers. Ovary ovoid, glabrous, with a short style and capitate stigma.—Central Madagascar, *Baron* 1753! We have specimens of the other Madagascar species (*C. madagascariensis*, Baill. Adans. xi. 180), gathered both by Bojer and Lyall 148.

CHAILLETIA (§ LEUCOSIA) DISCOLOR, n. sp.

Arborea, ramulis persistenter brunneo-tomentosis, foliis breviter petiolatis obovato-oblongis acutis facie viridibus brevissime pubescentibus dorso albido-incanis venulosis, floribus in cymas parvas laterales paucifloras dispositis, pedicellis flori æquilongis, calycis segmentis lanceolatis tomentosis, petalis oblanceolatis integris nigro-purpureis quam calyx vix longioribus, staminibus petalis æquilongis, stylo apice cuspidato.

A tree, with slender terete branchlets, densely and persistently clothed with short bright brown pubescence. Leaves alternate, shortly petioled, 3–4 in. long, 1–$1\frac{1}{4}$ in. broad, acute, narrowed gradually from the middle to the base, green and obscurely pilose above, clothed with thin persistent whitish tomentum beneath, with raised veins and veinlets. Flowers in short peduncled lateral cymes, either with or without a large leaf from the base. Calyx $\frac{1}{8}$ in. long, densely brown-tomentose, cut down nearly to the base into lanceolate segments. Petals oblanceolate, purplish black, scarcely longer than the calyx. Filaments filiform; anthers minute, suborbicular. Style half as long as the filaments, distinctly cuspidate at the tip. Fruit of two pilose lobes the size of a pea.—Forest of Alamazaotra, *Baron* 1403! Allied to *C. Bojeri*, Tulasne in Ann. Sc. Nat. ser. 4, vol. viii. p. 85.

HARTOGIA ? TRILOBOCARPA, n. sp.

Glaberrima, ramulis foliisque oppositis, foliis brevissime petiolatis obovato-oblongis crassis rigidis inciso-crenatis, cymis axillaribus paucifloris breviter pedunculatis, calycis segmentis 5 orbicularibus minutis, petalis 5 ovato-oblongis quam calyx duplo longioribus, fructu capsulari turbinato triloculari apice depresso trilobato.

A much-branched shrub or small tree, glabrous in all its parts, with slender contiguous erecto-patent woody ultimate branchlets.

Petiole very short; blade 1–$1\frac{1}{2}$ in. long, $\frac{1}{2}$–$\frac{5}{8}$ in. broad, obtuse, thick and rigid in texture, inciso-crenate above the deltoid base, green and glabrous on both surfaces, with fine close veining. Flowers 1–3 together in copious axillary cymes shorter than the leaves; pedicels finally $\frac{1}{12}$ in. long. Expanded fruit-calyx $\frac{1}{12}$ in. in diam.; segments orbicular. Petals 5, ovate-oblong, twice as long as the calyx. Stamens with a filament as long as the orbicular incurved anther. Fruit a turbinate indehiscent brown coriaceous capsule under $\frac{1}{4}$ in. long, with a depression tipped with the short persistent style in the centre of the three-lobed apex and single exarillate seed in each of the three cells.—Central Madagascar, *Baron* 1183! Will, not unlikely, prove a new genus.

GYMNOSPORIA CRATÆGINA, n. sp.

Arborea, glabra, spinosa, foliis petiolatis subcoriaceis ovato-oblongis obtusis serrulatis, cymis axillaribus compositis pedunculatis, pedicellis flore longioribus, bracteis minutis lanceolato-deltoideis, calycis segmentis 5 orbicularibus valde imbricatis, petalis ovatis quam calyx 2–3plo longioribus, staminibus calyci æquilongis.

A tree, glabrous in all its parts, with terete rather flexuose branchlets, armed with deflexed woody pungent cylindrical spines $\frac{1}{2}$–$\frac{3}{4}$ in. long. Leaves alternate or fascicled on short suppressed branchlets; petiole under $\frac{1}{4}$ in. long; blade $1\frac{1}{2}$–2 in. long, obtuse, deltoid at the base, subcoriaceous, dark green above, drab-green beneath, with fine immersed veins. Flowers 10–20 in copious peduncled axillary cymes, which are sometimes as long as the leaves; pedicels $\frac{1}{8}$–$\frac{1}{6}$ in. long. Calyx half a line long; segments 5, orbicular, much imbricated. Petals $\frac{1}{12}$ in. long. Stamens 5, with filiform inflexed filaments and minute orbicular anthers. Fruit not seen.—Central Madagascar, *Baron* 1194! 2102! A near ally of *G. leptopus* and *G. berberidacea*.

GYMNOSPORIA BERBERIDACEA, n. sp.

Ramosissima, glabra, spinosa, foliis parvis subcoriaceis brevissime petiolatis obovatis vel oblongis obscure crenatis sæpe ad axillas spinarum fasciculatis, floribus minutis 4–5meris in cymas copiosas pedunculatas 4–5-floras dispositis, pedicellis brevibus, bracteis minutis deltoideis, sepalis orbicularibus ciliatis, petalis obovatis quam sepala 2–3plo longioribus, staminibus inclusis.

A much-branched erect shrub, glabrous in all its parts. Spines pungent, woody, straight, slender, $\frac{1}{4}$–$\frac{1}{3}$ in. long. Leaves alternate or often fascicled in the axils of the spines, through the non-development of branchlets, nearly sessile, $\frac{1}{3}$–$\frac{1}{2}$ in. long, obtuse, cuneate at the base, firm in texture, green and glabrous on both surfaces. Flowers in copious 1–2nate axillary cymes on slender peduncles $\frac{1}{2}$–$\frac{3}{4}$ in. long; pedicels about as long as the flower, with small deltoid persistent brown bracts at the base. Expanded calyx not more than $\frac{1}{2}$ lin. in diam.; sepals 4–5, unequal, orbicular, much imbricated, fimbriato-ciliate. Petals obovate, $\frac{1}{2}$ line long. Stamens 4–5, just longer than the calyx. Fruit unknown.—Central Madagascar, *Lyall* 346! *Baron* 781! 2054! A close ally of *Gymnosporia leptopus* (*Catha leptopus*, Tulasne in Ann. Sc. Nat. sér. 4, viii. 100), which differs by its longer peduncles, more numerous flowers in a cyme, and larger pale green leaves more narrowed at the base. That also has the same *Berberis*-like habit of growth, with the leaves often fascicled in the axils of the spines.

GYMNOSPORIA PANICULATA, n. sp.

Glaberrima, ramis spinis magnis patulis pungentibus armatis, foliis sessilibus oblanceolatis coriaceis pallidis serrulatis, floribus minutis pentameris in cymas sessiles multifloras in paniculam angustam aggregatas dispositis, pedicellis flori æquilongis, bracteis minutis deltoideis persistentibus, sepalis orbicularibus, petalis obovatis quam calyx 2–3plo longioribus, staminibus inclusis.

A shrub, glabrous in all its parts, with whitish terete woody branchlets, armed with copious spreading straight pungent spines 1–2 in. long, which sometimes bear leaves. Leaves sessile, 1–1$\frac{1}{2}$ in. long, $\frac{1}{3}$–$\frac{1}{2}$ in. broad, firm in texture, pale green on both surfaces, minutely serrulate, obtuse, narrowed from the middle to the base. Cymes sessile, densely many-flowered, under half an inch long and broad, forming an entirely leafless peduncled terminal panicle half a foot long, under an inch broad; pedicels about as long as the flowers; bracts minute, deltoid, persistent. Calyx not more than $\frac{1}{2}$ lin. in diam.; sepals orbicular, much imbricated, coriaceous, subentire. Petals obovate, $\frac{1}{2}$ lin. long. Bud globose, $\frac{1}{3}$ lin. in diam. Fruit unknown.—Central Madagascar, *Bojer*!

ELÆODENDRON OLIGANTHUM, n. sp.

Glabrum, foliis parvis breviter petiolatis oblongis obtusis coriaceis crenatis, cymis copiosis axillaribus 3–4-floris, pedunculis pedicellisque brevibus, calycis segmentis deltoideis, petalis orbicularibus imbricatis, staminibus calyci æquilongis, fructu duro glabro parvo brunneo integro vel lobato.

A shrub, glabrous in all its parts, with slender woody terete branchlets. Leaves alternate; petiole $\frac{1}{8}$–$\frac{1}{6}$ in. long; blade 1–1$\frac{1}{2}$ in. long, under an inch broad, obtuse, deltoid at the base, thick and rigid in texture, dark green above, drab beneath, with fine inconspicuous veining. Flowers in copious small cymes in the axils of the leaves; peduncle $\frac{1}{6}$–$\frac{1}{4}$ in. long; pedicels a little longer than the flowers; bracts minute, deltoid. Calyx minute, with 5 deltoid lobes. Expanded corolla not more than $\frac{1}{12}$ in. in diam.; petals orbicular, yellowish green, much imbricated. Fruit hard, brown, globose, $\frac{1}{4}$–$\frac{1}{3}$ in. in diam., simple or two-lobed.—Central Madagascar, *Baron* 1938! 2159!

ELÆODENDRON PILOSUM, n. sp.

E. ramulis pilosis, foliis parvis alternis breviter petiolatis subcoriaceis obovatis vel oblongis subintegris facie glabris dorso obscure pilosis, cymis axillaribus 2–3-floris breviter pedunculatis, pedicellis brevibus, bracteis minutis deltoideis persistentibus, calycis segmentis 5 deltoideis, petalis 5 parvis orbicularibus luteo-viridibus, staminibus quam petala duplo brevioribus, fructu biloculari putamine crasso corneo.

A shrub, with very slender densely pilose terete woody branchlets. Petiole $\frac{1}{8}$–$\frac{1}{6}$ in., densely pilose; blade $\frac{3}{8}$–1$\frac{1}{4}$ in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. broad, obtuse, rounded at the base, obscurely crenulate, firm in texture, green on both surfaces, with fine ascending main veins, obscurely pilose beneath. Cymes copious, axillary, shorter than the leaves, 2–3-flowered; pedicels not longer than the flowers, pilose, with small persistent deltoid bracts at the base. Expanded corolla $\frac{1}{12}$ in. in diam.; sepals pilose, half as long as the orbicular petals. Disk large, pentagonal. Stamens 5, not more than half as long as the petals; anthers orbicular. Drupe not larger than a pea, oblong, 2-celled, with a thick bony endocarp. —Central Madagascar, *Baron* 1204!

VITIS (§ CISSUS) LENTICELLATA, n. sp.

Fruticosa, glabra, ramulis gracilibus sarmentosis cirriferis copiose lenticellatis, foliis simplicibus obovato-oblongis cuspidatis serratis brevissime petiolatis firmulis glabris, floribus tetrameris in cymas laxas paucifloras breviter pedunculatas dispositis, pedicellis quam flos 2–3plo longioribus, calyce campanulato truncato, petalis oblongis viridibus, staminibus brevibus.

A woody climber, with slender branchlets roughened with copious lenticels and long tendrils of firm texture. Petiole not more than $\frac{1}{8}$–$\frac{1}{6}$ in.; blade obovate-oblong, cuspidate, rounded at the base, inconspicuously or sometimes distinctly serrated, 1½–2 in. long, moderately firm in texture, green and glabrous on both surfaces. Flowers few together in cymes on short peduncles, which sometimes are aggregated into a panicle at the end of the branchlets; pedicels glabrous, ⅛–⅕ in. long. Calyx campanulate, ½ lin. in diam., quite truncate. Petals greenish, oblong. Disk very prominent. Stamens very short. Immature fruit glabrous, oblong.—Central Madagascar in forests of the province of Imerina, *Baron* 404! 439! 1294! 1934! Allied to *V. producta*, Afzel., of Sierra Leone.

VITIS (§ CISSUS) TRITERNATA, n. sp.

Fruticosa, ramulis gracilibus glabris sarmentosis copiose cirriferis, foliis triternatis, foliolis oblongis cuspidatis serratis membranaceis utrinque viridibus glabris, floribus minutis tetrameris in cymas multifloras dispositis, pedicellis brevissimis, calyce patellæformi obscure lobato, petalis oblongis viridibus, staminibus 4 quam petala brevioribus.

A climber, with very slender woody glabrous branchlets with copious simple or compound slender tendrils. Fully developed leaves deltoid, 2–3 in. long and broad, triternately compound, with a common petiole about an inch long; leaflets oblong, with a large cusp, ¾–1 in. long, narrowed to a rounded base, strongly serrated, thin in texture, green and glabrous on both surfaces. Cymes lateral, 1–1½ in. broad, with three main forks, bearing sometimes 100 flowers, the peduncle 1–1½ in. long, sometimes bearing a small petioled biternate leaf; branches pilose; final pedicels very short. Bud globose, not more than half a line in diam. Calyx patellæform, green, obscurely 4-lobed. Petals 4, oblong, greenish, ½ line long. Stamens 4, shorter than the petals. Berry unknown.—Central Madagascar, *Baron* 743! Nearly allied to *V. biternata*, Baker in Trimen's Journ. 1882, p. 50.

CALYCIFLORÆ.

LEBECKIA? RETAMOIDES, n. sp.

Fruticosa, erecta, ramosissima, ramulis erectis virgatis multisulcatis aphyllis superne pilosis, floribus ad apices ramorum paucis laxe racemosis, bracteis minutis deltoideis, calycis pilosi tubo campanulato dentibus 5 tubo æquilongis, petalis rubellis calycem duplo superantibus, vexillo orbiculari extus velutino, carina obtusa quam vexillum paulo breviore, legumine cylindrico parvo albido velutino septato 5–6-spermo.

An erect shrub, with the habit of our English broom (*Saro-*

thamnus), but entirely leafless, with very numerous slender wiry multisulcate branchlets, glabrous except towards the tip. Proper leaves none, the branchlets subtended only at the base by minute lanceolate rigid persistent bracts. Flowers few, in lax irregular racemes towards the tip of the branchlets, on densely pilose pedicels $\frac{1}{12}$–$\frac{1}{8}$ in. long, with a minute bract at the base. Calyx $\frac{1}{8}$ in. long, densely pilose, with 5 distinct lanceolate-deltoid teeth as long as the tube. Corolla reddish, twice as long as the calyx; standard orbicular, $\frac{1}{4}$ in. broad; wings and keel a little shorter than the standard. Stamens monadelphous, $\frac{1}{6}$ in. long, the tube closed along the top in an early stage. Legume cylindrical $\frac{1}{2}$–$\frac{3}{4}$ in. long, $\frac{1}{6}$ in. broad, rigid in texture, densely persistently white-silky, with septa between the small globose seeds.—Central Madagascar, *Baron* 1827! A curious plant, entirely leafless so far as our material goes. The genus *Lebeckia* is known at the Cape only.

CROTALARIA ORTHOCLADA, n. sp.

Herbacea, perennis, erecta, ramosa, glabra, stipulis foliaceis persistentibus, foliis petiolatis, digitatim trifoliolatis, foliolis oblanceolatis obtusis, racemis terminalibus laxis multifloris, pedicellis calyci æquilongis, bracteis caducis minutis, calycis dentibus tubo æquilongis, petalis quam calyx duplo longioribus, legumine stipitato lineari-oblongo glabro 6–8-spermo.

An erect copiously-branched perennial herb, several feet high, glabrous in all its parts, with long stiff erecto-patent branchlets. Petiole $\frac{1}{4}$–$\frac{1}{3}$ in. long; stipules lanceolate, foliaceous, persistent, as long as the petiole; leaflets $\frac{1}{2}$–$\frac{3}{4}$ in. long, shortly petiolulate, moderately firm in texture, green and glabrous on both surfaces, 1-nerved. Flowers 6–12 in lax terminal peduncled racemes; pedicels $\frac{1}{8}$–$\frac{1}{6}$ in. long. Calyx $\frac{1}{6}$–$\frac{1}{5}$ in. long; teeth lanceolate-deltoid, as long as the campanulate tube. Corolla twice as long as the calyx; standard orbicular; keel $\frac{1}{6}$ in. deep in the centre. Legume linear-oblong, brown, glabrous, $\frac{1}{2}$–$\frac{3}{4}$ in. long, with a stipe as long as the calyx.—Central Madagascar, *Baron* 2063! Closely allied to *C. goreensis*, Guill. & Perot., as is also the next species.

CROTALARIA TENUIS, n. sp.

Herbacea, perennis, glabra, caulibus gracillimis basi decumbentibus, stipulis magnis foliaceis persistentibus, foliis petiolatis digitatim trifoliolatis, foliolis oblanceolatis, racemis laxis paucifloris terminalibus, pedicellis calyci æquilongis, bracteis minutis caducis, calycis segmentis lanceolato-deltoideis tubo campanulato æquilongis, petalis quam calyx duplo longioribus, ovario glabro pedicellato lineari-oblongo.

A perennial herb, under a foot high, with very slender stems ascending in the upper half, glabrous in all its parts. Petiole $\frac{1}{6}$–$\frac{1}{4}$ in. long; stipules lanceolate, foliaceous, as long as the petiole; leaflets $\frac{1}{4}$ in. long, obtuse, with a minute mucro. Flowers 3–6 in very lax terminal racemes; pedicels $\frac{1}{6}$–$\frac{1}{5}$ in. long; bracts very minute, lanceolate. Calyx $\frac{1}{6}$ in. long; teeth lanceolate or lanceolate-deltoid. Corolla $\frac{1}{3}$ in. long; standard orbicular. Ovary linear-oblong, glabrous, stipitate, many-ovuled.—Central Madagascar, *Baron* 1862! 2149!

ARGYROLOBIUM EMIRNENSE, n. sp.

Herbaceum, perenne, ramosissimum dense pilosum, foliis trifoliolatis breviter petiolatis, stipulis lanceolatis persistentibus, foliolis oblongis cuspidatis utrinque dense pilosis, floribus 1–2nis axillaribus longe pedunculatis, pedicellis brevissimis, calyce profunde bilabiato dentibus parvis lanceolatis, carina et alis obovatis, legumine lineari recto 8–10-spermo haud toruloso intus continuo.

A herbaceous perennial, densely branched from the crown of the root, with slender terete densely pilose stems about half a foot long. Petiole not more than $\frac{1}{8}$–$\frac{1}{6}$ in. Stipules lanceolate, persistent, pilose, as long as the petiole; leaflets 3, sessile, obovate or oblong, densely pilose on both surfaces, the end one $\frac{1}{2}$–$\frac{3}{4}$ in. long, the side ones smaller. Flowers 1–2 on axillary peduncles 2–3 in. long; pedicels very short; bracts minute, linear. Calyx $\frac{1}{4}$ in. long, infundibuliform, pilose, deeply bilabiate; teeth of both lips small, lanceolate. Standard obovate, obtuse, twice as long as the calyx, hairy on the outside. Wings obovate, a little longer than calyx, equalling the keel. Pod linear, 1–1$\frac{1}{4}$ in. long, $\frac{1}{8}$ in. broad, straight, glabrous when mature, nearly flat, not at all torulose, not at all septate internally. Seeds 8–10, orbicular, glabrous.—Central Madagascar, *Baron* 846! 1793! Allied to the common Himalayan *A. flaccidum*. Adds this Cape, Tropical-African, and East-Indian genus to the Madagascar flora.

GENISTA? MADAGASCARIENSIS, n. sp.

Fruticosa, ramulis virgatis multisulcatis glabris, foliis rudimentariis simplicibus pilosis fasciculatis, floribus solitariis axillaribus breviter pedicellatis, calycis bilabiati tubo campanulato, labiis deltoideis, inferiore tridentato, petalis angustis æqualibus quam calyx triplo longioribus, legumine lineari-oblongo compresso polyspermo.

A much-branched erect shrub, with the habit of our common English broom (*Sarothamnus scoparius*), with wiry multisulcate firm slender branches and copious erect branchlets. Leaves only seen in a rudimentary state, contemporary with the flowers, in tufts on short suppressed branchlets, sessile, simple lanceolate, densely pilose. Flowers solitary on short pedicels from the axils of the leaves. Calyx $\frac{1}{12}$ in. long, with two deltoid lips shorter than the tube, the lower obscurely 3-toothed. Corolla white, $\frac{1}{4}$ in. long; standard and wings narrow; keel narrow, obtuse, all about equal in length. Stamens united in the lower half into a tube slit along the top by the expanding ovary. Immature legume linear-oblong, laterally flattened, densely pilose, tipped by the filiform curved glabrous style.—Central Madagascar, *Baron* 1727! A curious plant, of which the systematic position is doubtful, for want of developed leaves and legume in mature condition, with seeds. Likely it may prove a new genus.

INDIGOFERA THYMOIDES, n. sp.

Herbacea, perennis, caulibus capillaribus decumbentibus copiose ramosis, stipulis minutis deltoideis, foliis brevissime petiolatis digitatim trifoliolatis, foliolis minutis ovatis mucronatis parce hispidis, racemis axillaribus pedunculatis laxissime 3–4-floris, pedicellis quam calyx longioribus, bracteis minutis caducis, calycis dentibus lanceolatis tubo campanulato æquilongis, petalis lilacinis quam calyx 3–4plo longioribus, ovario cylindrico glabro multiovulato.

A much-branched perennial herb, with very slender trailing stems a foot or more long. Petiole very short; leaflets $\frac{1}{12}$ in. long, firm in texture, dark green, distinctly mucronate, with a few adpressed white bristly hairs. Flowers in axillary racemes on peduncles 1–1$\frac{1}{2}$ in. long; pedicels very slender, $\frac{1}{12}$–$\frac{1}{8}$ in. long; bracts minute, deltoid, caducous. Calyx not more than $\frac{1}{2}$ line long, teeth lanceolate, as long as the campanulate tube. Corolla lilac, $\frac{1}{6}$ in. long. Mature legume not seen.—Central Madagascar, *Baron* 1812! 2047! Differs from all the Tropical-African Dissitifloræ by its trifoliolate leaves.

INDIGOFERA PARKERI, n. sp.

Suffruticosa, ramulis gracilibus apice obscure pilosis, foliis imparipinnatis, foliolis 5 alternis obovatis cuspidatis obscure strigillosis, racemis multifloris subdensis pedunculatis folio longioribus, pedicellis brevissimis, calycis tubo brevi dentibus elongatis acuminatis, petalis rubris quam calyx paulo longioribus, legumine recto lineari subtetragono 8–10-spermo obscure piloso.

A shrub, with slender terete woody greenish branchlets, obscurely pilose towards the tip only. Leaf 1–$1\frac{1}{2}$ in. long, shortly petioled; stipules lanceolate, persistent; leaflets obovate-cuneate, $\frac{1}{2}$–$\frac{3}{4}$ in. long, subobtuse, with a minute mucro, alternate, minutely petiolulate, moderately firm in texture, green with a few adpressed white bristly hairs on both surfaces. Racemes moderately dense, 1–2 in. long, on peduncles about as long as the leaves; pedicels very short. Calyx $\frac{1}{8}$ in. long, with a campanulate tube and linear setaceous teeth 2–3 times as long as the tube. Corolla bright red, half as long again as the calyx. Pod straight, under an inch long, $\frac{1}{2}$ lin. broad, thinly pilose, the valves strongly keeled, not torulose, 8–10-seeded, septate between the seeds.—Central Madagascar, *Parker*! Nearly allied to the common Indian *I. trita*, L. fil., and *I. subulata*, Vahl.

INDIGOFERA PINIFOLIA, n. sp.

Suffruticosa, ramulis gracillimis albo-sericeis, foliis brevissime petiolatis imparipinnatis, stipulis linearibus persistentibus, foliolis 9–11 linearibus 1-nervis firmulis hispidis margine revolutis, racemis laxis axillaribus paucifloris pedunculatis, bracteis lanceolatis persistentibus, calycis dentibus deltoideo-cuspidatis tubo campanulato æquilongis, petalis lilacinis quam calyx 3–4plo longioribus, ovario cylindrico multiovulato.

A much-branched undershrub, not more than a foot long, with slender wiry stems densely clothed with adpressed white bristly hairs. Leaves nearly sessile, about $\frac{1}{4}$ in. long, $\frac{1}{3}$ in. broad; stipules lanceolate, as long as the petiole; leaflets $\frac{1}{8}$–$\frac{1}{5}$ in. long, 1-nerved, firm in texture, with very revolute edges, densely clothed with adpressed white bristly hairs. Racemes copious, moderately close, 6–8-flowered, two or three times as long as the leaves; pedicels $\frac{1}{8}$–$\frac{1}{4}$ in. long; bracts minute, lanceolate-deltoid, persistent. Calyx $\frac{1}{12}$ in. long, densely bristly; teeth deltoid-cuspidate. Corolla lilac, $\frac{1}{6}$ in. long; standard orbicular, emarginate, $\frac{1}{6}$ in. broad, hairy on the outside. Mature legume not seen.—Central Madagascar, *Baron* 2136! Group of *Tinctoriæ*, allied to *I. Bojeri* and *I. pedunculata*.

INDIGOFERA PECTINATA, n. sp.

Suffruticosa, ramulis glabris, foliis imparipinnatis distantibus brevissime petiolatis, stipulis lanceolatis persistentibus, foliolis 7–9 lanceolatis acutis facie glabris dorso obscure strigillosis, racemis multifloris elongatis quam folium 2–3plo longioribus, pedicellis brevissimis, calycis tubo brevi, segmentis elongatis lineari-setaceis, petalis rubris quam calyx paulo longioribus, ovario lineari multiovulato.

A shrub, with slender terete green glabrous branchlets. Leaf $1\frac{1}{2}$–2 in. long; petiole very short; bracts persistent, scariose, lanceolate acuminate, $\frac{1}{6}$ in. long; leaflets lanceolate, $\frac{3}{4}$–1 in. long, $\frac{1}{6}$ in. broad, narrowed to the base and acute point, moderately firm in texture, green on both surfaces, glabrous above, with a thin coating of adpressed white bristly hairs beneath. Racemes 2–3 in. long, dense upwards, lax lower down, on axillary peduncles 1–$1\frac{1}{2}$ in. long; pedicels very short. Calyx $\frac{1}{8}$ in. long, with a short tube and long linear-setaceous teeth. Corolla red, glabrous, half as long again as the calyx. Ovary linear, glabrous, multiovulate. Pod not seen.—Central Madagascar, *Baron* 746! Allied to *I. Heudelotii*, Benth., of West Tropical Africa, and *I. pedunculata* (Hils. et Bojer), Baker in Trimen's Journ. 1882, p. 67. Probably this latter is identical with *I. Bojeri*, Vatke in Rel. Ruten. ii. 245; but the previously named *I. Bojeri*, Baker in Journ. Linn. Soc. xviii. 266, is a different species.

INDIGOFERA LYALLII, n. sp.

Fruticosa, ramulis dense pubescentibus, foliis imparipinnatis breviter petiolatis, stipulis lineari-setaceis pilosis, foliolis 15–23 oblongis obtusis mucronatis distincte petiolulatis utrinque pilosis, racemis densis axillaribus pedunculatis folio subæquilongis, pedicellis brevibus, calycis pilosi tubo campanulato dentibus setaceis tubo longioribus, petalis rubellis quam calyx triplo longioribus, legumine lineari 5–6-spermo septato.

A shrub or small tree, with densely pilose woody slender branchlets. Leaves crowded, 3–4 in. long; petiole $\frac{1}{4}$–$\frac{1}{3}$ in.; stipules as long as the petiole, persistent; leaflets 7–11-jugate, opposite, about $\frac{1}{2}$ in. long, rounded at both ends, with a very distinct mucro, dark green and thinly pilose above, pale green and densely pilose with a brown costa beneath. Racemes copious, axillary, 1–$1\frac{1}{2}$ in. long, with a peduncle about as long; pedicels nearly as long as the calyx. Calyx $\frac{1}{12}$ in. long, densely pilose; teeth setaceous, unequal, plumose, longer than the tube. Corolla $\frac{1}{4}$ in. long, bright red; standard pilose on the back. Pod 1–$1\frac{1}{4}$ in. long, $\frac{1}{12}$ in. broad, straight, turgid, not torulose.—Central Madagascar, gathered long ago by Bojer and Lyall (241) and now by Baron (941). Closely allied to *I. stachyodes*, Lindl. Bot. Reg. xxix. t. 14, and the well-known Indian *I. pulchella*, Roxb.

TEPHROSIA MONANTHA, n. sp.

Fruticosa, ramulis pilosis, stipulis lanceolatis, foliis imparipinnatis, foliolis 13–15 oblanceolatis obtusis facie subglabris dorso dense albido-

sericeis, floribus solitariis axillaribus breviter pedicellatis, calycis brunneo-sericei dentibus tubo æquilongis, petalis rubris quam calyx 3–4plo longioribus, ovario cylindrico piloso multiovulato.

A branched shrub, with the old branchlets woody and calvate, the young branchlets densely pilose. Petiole $\frac{1}{2}$ in. long, very silky; stipules lanceolate, pilose, persistent, $\frac{1}{6}$ in. long; leaf 2–3 in. long; leaflets $\frac{1}{2}$–$\frac{3}{4}$ in. long, obtuse, moderately firm in texture, bright green and nearly glabrous on the upper surface, densely white-silky beneath. Flowers solitary in the axils of the leaves on silky pedicels as long as the calyx. Calyx $\frac{1}{6}$ in. long, densely brown-silky; teeth lanceolate-deltoid, as long as the tube. Corolla $\frac{3}{4}$ in. long, petals equal in length; standard silky on the outside. Ovary cylindrical, silky, many-ovuled. Mature legume not seen.—Central Madagascar, *Baron* 1852!

MUNDULEA REVOLUTA, n. sp.

Fruticosa, ramulis dense pubescentibus, foliis imparipinnatis petiolatis, foliolis 5–11 lanceolatis crassis coriaceis margine revolutis, floribus in racemos breves subdensos axillares et terminales breviter pedunculatos dispositis, pedicellis calyci subæquilongis, calycis pilosi dentibus parvis lanceolatis vel deltoideis, petalis rubellis calycem triplo superantibus, vexillo extus persistenter sericeo, legumine parvo lanceolato crasso dense piloso 1–4-spermo.

A shrub, with slender terete woody densely pubescent branchlets. Leaves 2–3 in. long including the $\frac{1}{2}$ in. petiole; stipules minute, lanceolate, deciduous; rhachis densely pilose; leaflets opposite, nearly sessile, the upper $1\frac{1}{2}$–2 in. long, $\frac{1}{6}$ in. broad, the lower shorter, thick and rigid in texture, with strongly revolute edges, densely pilose on both surfaces, especially beneath. Racemes short, dense, axillary and terminal, panicled at the end of the branchlets; bracts minute; pedicels finally as long as the calyx. Calyx campanulate, densely silky; teeth lanceolate or deltoid, scarcely as long as the tube. Corolla reddish, $\frac{1}{3}$–$\frac{1}{2}$ in. long; standard orbicular, with a claw, densely silky on the outside. Stamens nearly as long as the corolla; free part of the filaments dilated upwards. Pod sessile, lanceolate, dehiscent, 1–$1\frac{1}{4}$ in. long, $\frac{1}{4}$–$\frac{1}{3}$ in. broad, very thick in texture, flat on the back of the densely sericeous valves. Seeds not more than 4, glabrous, blackish.—Central Madagascar, *Baron* 957! Known long ago and cultivated by Mr. Barclay and in the Mauritius Botanic Garden. It is called *Dalbergia Barclayi* in the Kew herbarium, but is not the plant figured as such in Hooker's Exotic Flora, t. 188.

ÆSCHYNOMENE HEURCKEANA, n. sp.

Fruticosa, glabra, ramulis gracillimis, stipulis magnis persistentibus lanceolato-sagittatis, foliis æqualiter pinnatis breviter petiolatis, foliolis 0–12-jugis lineari-oblongis, racemis axillaribus laxissimis paucifloris pedunculis pedicellisque hispidis, bracteis bracteolisque lanceolatis persistentibus, calycis dentibus parvis 2 superioribus deltoideis, inferioribus lanceolatis, petalis luteis quam calyx paulo longioribus, legumine stipitato plano glabro articulis 2 oblongis.

A shrub 3–5 feet high, with very slender woody glabrous brown branchlets. Leaves about an inch long including the short petiole; stipules lanceolate, $\frac{1}{2}$ in. long, with a pair of distinct lanceolate spurs at the base; leaflets contiguous, sensitive, shortly petiolulate, $\frac{1}{6}$ in. long, moderately firm in texture, obtuse, with a minute mucro. Racemes axillary, about as long as the leaves; pedicels $\frac{1}{4}$–$\frac{1}{3}$ in. long, with a pair of persistent shortly spurred lanceolate bracts at the base. Calyx glabrous, $\frac{1}{6}$ in. long, with a pair of persistent lanceolate bracteoles adpressed to it; teeth all small, those of the upper lip deltoid, of the lower lanceolate. Corolla yellow, glabrous, $\frac{1}{4}$ in. long. Pod flat, glabrous, distinctly stipitate, with two oblique oblong articulations $\frac{1}{6}$–$\frac{1}{5}$ in. long.—Central Madagascar, an old specimen in Herb. Kew. without collector's name and now regathered by Dr. G. W. Parker and Mr. Baron (2059). Like the Angolan *Æ. acutangula*, Welw., this connects the two sections *Euæschynomene* and *Ochopodium*, combining the habit and legume of the latter with the sagittate stipules of the former.

ÆSCHYNOMENE (§OCHOPODIUM) LAXIFLORA, *Bojer MSS.*

Fruticosa, glabra, ramulis gracillimis, stipulis parvis persistentibus ovato-cuspidatis basi haud sagittatis, foliis æqualiter pinnatis brevissime petiolatis, foliis 8–10-jugis oblongis parvis firmulis, racemis axillaribus laxissime 3–4-floris folio longioribus, pedicellis brevibus, bracteolis minutis persistentibus, calyce bilabiato lobis subintegris, petalis luteis quam calyx duplo longioribus, ovario stipitato hispido articulis 2–3.

A small shrub, with very slender terete brown branchlets. Leaves not more than an inch long, with very short petioles, with a pair of rigid ovate persistent stipules $\frac{1}{12}$–$\frac{1}{8}$ in. long at the base; leaflets $\frac{1}{6}$ in. long, very obtuse, with a minute mucro, subcoriaceous in texture, with distant erecto-patent veins raised on the under surface. Racemes 2–3 in. long including the peduncle;

pedicels $\frac{1}{12}$–$\frac{1}{6}$ in., ascending, scabrous, bracts deciduous. Calyx $\frac{1}{12}$ in. long, deeply bilabiate, glabrous, with a pair of minute persistent ovate bracteoles adpressed to it; lips ovate. Corolla yellow, glabrous, $\frac{1}{4}$ in. long. Ovary with a gynophore as long as the calyx, and 2–3 rather hispid suborbicular articulations.—Central Madagascar, *Bojer*!

DESMODIUM (§ NICOLSONIA) RADIATUM, n. sp.

Herbaceum, perenne, caulibus gracillimis decumbentibus pilosis, foliis trifoliolatis, foliolis parvis orbicularibus vel oblongis tenuiter pilosis, floribus in capitula parva terminalia aggregatis, bracteis late ovatis, pedicellis brevissimis, calycis pilosi tubo brevissimo segmentis lanceolatis acuminatis, petalis purpureis quam calyx paulo longioribus, ovario piloso pauciovulato.

A herbaceous perennial, with very slender decumbent pilose stems a foot or more long, radiating from the crown of the root. Petiole very short; stipules minute, lanceolate, brown, persistent; blade rarely 1-foliolate; end leaflet usually orbicular, $\frac{1}{6}$–$\frac{1}{4}$ in. long and broad, rarely oblong; texture moderately firm; upper surface bright green, obscurely shortly strigillose; lower surface paler and more hairy. Flowers in dense sessile terminal heads and occasionally from the axil of the upper leaves; pedicels very short; bracts orbicular, persistent, shaggy. Calyx densely pilose, $\frac{1}{8}$ in. long; teeth lanceolate acuminate, densely pilose. Corolla purplish red, glabrous, half as long again as the calyx. Ovary linear, pauciovulate, densely hairy, narrowed into the long incurved style. Pod not seen.—Central Madagascar, *Parker*! *Baron* 681! 895!

DESMODIUM (§NICOLSONIA) MONOSPERMUM, n. sp.

Herbaceum, perenne, caulibus gracillimis decumbentibus pilosis, stipulis persistentibus lanceolatis, foliis unifoliolatis parvis cordato-ovatis facie glabris dorso tenuiter pilosis, floribus in racemos densos oblongos terminales aggregatis, bracteis magnis orbicularibus cuspidatis persistentibus dense pilosis, pedicellis brevissimis, calycis tubo brevissimo dentibus lanceolatis plumosis, petalis inclusis, legumine articulo unico parvo orbiculari dehiscente.

A perennial herb, with very slender pilose decumbent stems radiating from the crown of the root. Petiole slender, about $\frac{1}{6}$ in. long; stipules minute, lanceolate, brown, scariose, persistent; leaves 1-foliolate, cordate-ovate, acute, $\frac{1}{4}$–$\frac{1}{2}$ in. long, moderately firm in texture, bright green and glabrous above, paler and pilose beneath. Flowers in dense sessile oblong terminal heads; bracts orbicular cuspidate, densely silky, persistent,

$\frac{1}{6}$ in. long and broad; pedicels very short. Calyx $\frac{1}{6}$ in. long, slit down nearly to the base into 5 lanceolate-acuminate plumose teeth. Corolla not longer than the calyx. Pod of a single dehiscent orbicular sessile joint $\frac{1}{8}$ in. in diam.—Ambohimanga, Central Madagascar, *Dr. Parker*. Both this and the last are small trailing species with the habit of *D. triflorum*, DC.

MUCUNA (§ CITTA) PANICULATA, n. sp.

Volubilis, fruticosa, ramulis brunneo-velutinis, stipulis minutis lanceolatis, foliis pinnatim trifoliolatis nigrescentibus stipellatis utrinque tenuiter pilosis, foliolo terminali orbiculari cuspidato, floribus in paniculas longe pedunculatas ramis dense racemosis dispositis, bracteis magnis caducis, calycis magni labio superiore deltoideo, labii inferioris dentibus lanceolatis, carina acuminata quam calyx 2–3plo longiore, alis carina paulo brevioribus, vexillo alis distincte brevioribus, legumine lineari-oblongo lamellis transversis multis prædito pilis hispidis dense armato.

A shrubby climber, with slender pilose leafy branches. Petiole $1\frac{1}{2}$–2 in. long; leaves moderately firm in texture, turning black when dried, obscurely pilose on both surfaces; end leaflet 3–4 in. long and nearly as broad. Flowers in a long-stalked terminal panicle with dense racemose branches densely clothed with short brown pubescence, the end one half a foot long, the side ones shorter, ascending; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in. long. Calyx with a campanulate tube $\frac{1}{2}$ in. long and broad; upper lip deltoid, $\frac{1}{4}$ in. long, bifid at the apex; side teeth deltoid; lowest longer, lanceolate. Corolla turning black; keel $2\frac{1}{2}$ in. long, acuminate; standard $\frac{1}{2}$–$\frac{3}{4}$ in. shorter than the keel. Legume $\frac{1}{2}$ ft. long, $1\frac{1}{2}$ in. broad, many-seeded, with crowded oblique transverse lamellæ densely clothed all over with brown fragile bristles.—Central Madagascar, an imperfect specimen sent in 1870 by the Rev. W. Ellis, and now rediscovered by Mr. Baron (1605)! in woods 25 miles from the east coast.

RHYNCHOSIA (§ COPISMA) VERSICOLOR, n. sp.

Fruticosa, ramulis lignosis dense breviter pilosis, stipulis parvis lanceolatis, foliis trifoliolatis subcoriaceis tenuiter pilosis, foliolo terminali cordato late ovato, racemis laxis copiosis axillaribus et terminalibus bracteis caducis, calycis pilosi tubo campanulato dentibus lanceolatis, petalis versicoloribus, vexillo pulchro lineato, legumine lineari-oblongo piloso.

A small shrub, with densely pilose slender brownish woody branchlets. Stipules spreading, brown, scariose, $\frac{1}{12}$ in. long; petiole under an inch long; end leaflet on a petiolule $\frac{1}{4}$–$\frac{1}{3}$ in. long, ovate-orbicular, subobtuse, slightly cordate, 1–$1\frac{1}{2}$ in. long, dark green and nearly glabrous when mature on the upper surface, pale green and more hairy beneath. Flowers in copious lax axillary and terminal racemes about 2 in. long, with a densely pilose rhachis; pedicels $\frac{1}{8}$–$\frac{1}{6}$ in.; bracts small and caducous in an early stage. Calyx $\frac{1}{4}$ in. long, densely pilose; upper teeth lanceolate, as long as the tube; lower longer and very acuminate. Corolla half as long again as the calyx; standard yellow, marked with copious conspicuous blackish veins. Pod $\frac{1}{2}$–$\frac{3}{4}$ in. long, densely pilose, brown, $\frac{1}{6}$ in. broad, 2-seeded, the flat faces clothed with copious yellowish hairs with a bulbous base.—Central Madagascar, at Ambohimanga, *Dr. Parker*!

RHYNCHOSIA (§ COPISMA) RHODOPHYLLA, n. sp.

Fruticosa, ramulis dense pilosis, stipulis minutis lanceolatis caducis, foliis petiolatis trifoliolatis facie tenuiter pilosis dorso dense pilosis rubellis, foliolo terminali ovato, racemis copiosis laxis axillaribus et terminalibus, bracteis pilosis ovatis cuspidatis, calycis pilosi tubo campanulato dentibus lanceolatis, petalis rubellis, quam calyx duplo longioribus, ovario lineari dense piloso.

A shrub, with densely pilose slender woody branchlets. Stipules lanceolate, deciduous, $\frac{1}{12}$ in. long; petiole under an inch long; end leaflet broad ovate, 1–1$\frac{1}{4}$ in. long, subcoriaceous, obscurely cordate at the base, dark green and shortly pilose on the upper surface, densely clothed with persistent rather reddish pubescence beneath. Flowers in copious lax racemes with a densely pilose axis 2–3 in. long, which are sometimes panicled at the end of the branchlets; pedicels finally $\frac{1}{8}$ in. long; bracts ovate cuspidate, as long as the pedicels, soon falling. Calyx $\frac{1}{6}$ in. long, densely pilose, with a campanulate tube and 5 lanceolate teeth about as long as the tube. Corolla reddish, glabrous, twice as long as the calyx. Ovary 2-ovuled, densely pilose. Pod not seen.— Central Madagascar, *Baron* 771! Both this and the preceding species are allied to *R. caribæa*, DC.

ERIOSEMA BOJERI, *Benth. MSS.*

Fruticosa, ramulis dense pilosis, foliis distincte petiolatis pinnatim trifoliolatis, stipulis minutis caducis, foliolis oblongis obtusis minute mucronatis facie tenuiter dorso dense pubescentibus, racemis densis pedunculatis folio longioribus, pedicellis brevissimis, bracteis lanceolatis persistentibus, calycis dense pilosi tubo campanulato dentibus lanceolatis, petalis quam calyx duplo longioribus, vexillo extus piloso, ovario sessili dense piloso biovulato.

A shrub, with densely pilose slender woody branchlets. Petiole

$\frac{1}{3}$–$\frac{1}{2}$ in. long; stipules minute, linear, deciduous; end leaflet 1–1$\frac{1}{4}$ in. long, on a petiolule about $\frac{1}{4}$ in. long; side ones smaller face green, thinly pilose; back densely pubescent, with brown midrib and erecto-patent parallel primary veins. Racemes dense, oblong, on peduncles as long as the leaves; pedicels very short; bracts lanceolate, persistent, densely pilose, $\frac{1}{6}$ in. long. Calyx $\frac{1}{6}$ in. long, densely pilose; tube campanulate; teeth lanceolate, acuminate, rather longer than the tube. Corolla about twice as long as the calyx; standard veined with black lines and pilose on the outside. Ovary sessile, oblong, densely pilose, 2-ovuled. Pod not seen.—Central Madagascar, on the high mountains of the province of Imerina, *Bojer*. Allied to the Cape *E. cajanoides*, which is also a Madagascar plant.

ERIOSEMA PROCUMBENS, *Benth. MSS.*—Cytisus procumbens, *Bojer MSS.*

Herbaceum, perenne, ramulis gracillimis pilosis, foliis brevissime petiolatis sæpissime subdigitatim trifoliolatis, foliolis oblongis obtusis facie tenuiter dorso magis pilosis, floribus in racemos parvifloros axillares et terminales breviter pedunculatos dispositis, pedicellis brevissimis, calycis pilosi tubo brevi dentibus lanceolato-deltoideis acuminatis, petalis quam calyx duplo longioribus, legumine oblongo plano dense piloso sæpissime 2-spermo.

A perennial herb, with slender pilose stems $\frac{1}{2}$–1 foot long, radiating from the crown of the root. Stipules small, brown, lanceolate, persistent. Petiole about $\frac{1}{8}$ in. long; leaflets oblong or oblanceolate-oblong, 1–2 in. long, moderately firm in texture, bright green and obscurely pilose above, paler and thinly pilose beneath, the two side ones smaller than the end one, which has a petiolule not more than $\frac{1}{8}$ in. long. Racemes few-flowered, dense, terminal and axillary, shortly peduncled; pedicels $\frac{1}{12}$–$\frac{1}{8}$ in. long; bracts minute, lanceolate. Calyx densely pilose, $\frac{1}{6}$ in. long; teeth twice as long as the campanulate tube. Corolla half as long again as the calyx. Pod sessile, oblique oblong, $\frac{1}{2}$ in. long, $\frac{1}{4}$ in. broad, densely clothed with long adpressed silky hairs.—Central Madagascar, *Bojer*! *Lyall* 95! *Baron* 527! 841! *Parker*! Native name "Kofolona." Closely allied to the well-known Brasilian *E. crinitum*.—Var. MONOPHYLLUM, a dwarf variety with 1–2-flowered racemes and leaves almost invariably simple. *Baron* 1798! *Cytisus glomeratus*, Bojer, Hort. Maur. 89 (name only), another Madagascar species, is identical with *E. parviflorum*, E. Meyer, widely spread at the Cape and in Tropical Africa.

Cadia pubescens, *Bojer MSS.*

Arborea, ramulis dense pilosis, foliis breviter petiolatis imparipinnatis, foliolis 13–17 oblongis obtusis facie glabris dorso obscure pilosis, lateralibus oppositis brevissime petiolulatis, racemis brevibus axillaribus paucifloris, pedicellis pilosis calyce brevioribus, bracteis foliaceis, calycis magni campanulati dentibus deltoideis quam tubus 2–3plo brevioribus, petalis obovatis longe unguiculatis quam calyx paulo longioribus, staminibus inclusis, ovario lineari glabro stipitato multiovulato.

A tree, with slender woody terete densely pubescent branchlets. Leaves crowded, imparipinnate, 3–4 in. long; petiole very short; rhachis densely pilose; leaflets contiguous, opposite, patent, about $\frac{1}{2}$ in. long, $\frac{1}{4}$–$\frac{1}{3}$ in. broad, moderately firm in texture, very obtuse, broadly rounded at the base, dark green above, dull green beneath, finely veined. Racemes copious, axillary, much shorter than the leaves; peduncle and pedicels slender, densely pilose, the latter about $\frac{1}{2}$ in. long; bracts like the leaflets, but smaller. Calyx $\frac{1}{2}$–$\frac{3}{4}$ in. long, greenish, membranous, pubescent towards the base. Petals $\frac{3}{4}$–1 in. long. Stamens 10, nearly as long as the petals, with filiform filaments and small oblong versatile anthers. Ovary linear, glabrous, multiovulate, narrowed gradually into a short stipe and long curved style.—Central Madagascar, gathered long ago by Bojer, Hilsenberg and Lyall (85), and now refound by Baron, 960. It is mentioned briefly in the 'Flora of Tropical Africa,' ii. 256, but, I believe, has never been fully characterized.

Cadia Ellisiana, n. sp.

Glaberrima, ramulis gracilibus, foliis imparipinnatis, foliolis 5–7 magnis oblongis acuminatis subcoriaceis lucidis, lateralibus alternis distincte petiolulatis, racemis axillaribus paucifloris folio brevioribus, pedicellis longissimis, bracteis minutis lanceolatis, calycis campanulati dentibus deltoideis quam tubus 2–3plo brevioribus, petalis luteo-rubris obovato-unguiculatis quam calyx sub duplo longioribus, staminibus inclusis, legumine longe stipitato 5-6-spermo.

A tree or large bush, quite glabrous in all its parts, with slender terete brown woody branchlets. Petiole about an inch long; stipules not seen; blade half a foot long, with 5–7 alternate leaflets on thickened erecto-patent petiolules $\frac{1}{12}$ in. long, their blade narrowed into a long point, 3–4 in. long in the upper leaflets, 1–1$\frac{1}{2}$ in. broad at the middle, almost deltoid at the base, firm in texture, bright green on both surfaces. Racemes few-flowered, axillary, shortly peduncled; pedicels slender, ascending, 1–1$\frac{1}{4}$ in. long, with a small persistent lanceolate bract at the base. Calyx about $\frac{1}{2}$ in. long, with a campanulate tube and 5 equal deltoid teeth. Petals 1 in. long, $\frac{1}{2}$ in. broad at the tip, narrowed to a long claw. Stamens rather shorter than the petals, with filiform filaments and small versatile oblong anthers. Immature legume flat, thin, glabrous, narrowed gradually into a long gynophore and tipped with a straight persistent style nearly $\frac{1}{2}$ in. long.—Central Madagascar, *Rev. W. Ellis*! Forest of Alamazaotra, *Baron* 1488! 1540! Allied to *C. anomala*, Vatke in Linnæa, xliii. 337 (Hildebrandt 3368).

RUBUS MYRIANTHUS, n. sp.

Eglandulosus, aculeis parvis æqualibus deltoideo-cuspidatis, foliis digitatim quinquefoliolatis facie viridibus glabris dorso albo-incanis, foliolo terminali obovato-oblongo cuspidato inconspicue serrato, floribus in paniculas magnas deltoideas ramis bipinnatis dispositis, sepalis brevibus ovatis dorso albido-incanis, petalis oblongis, fructu globoso carpellis multis parvis.

A shrub, with slender angled stems glabrous when mature, finely downy when young, the prickles small, uniform and deltoid-cuspidate; gland-tipped bristles none. Stipules small, lanceolate; petiole above an inch long; leaves moderately firm in texture, bright green and glabrous above, clothed with thin white tomentum beneath; leaflets obovate-oblong cuspidate, the end one about 2 in. long, under an inch broad, with shallow inconspicuous teeth. Flowers very numerous, forming a deltoid panicle 6–9 in. long, with erecto-patent dense-flowered bipinnate branches, with only small leaves from the base of the lower ones. Sepals $\frac{1}{6}$ in. long. Petals obovate, whitish, twice as long as the sepals.—Forest of Alamazaotra, *Baron* 1535! 1685! Leaves like those of the European *R. discolor*; panicle like that of the New-Zealand *R. australis*, Forst., and Himalayan *R. lucens*, Focke.

RUBUS PAUCIFLORUS, n. sp.

Eglandulosus, aculeis paucis parvis æqualibus falcatis, foliis pinnatim trifoliolatis facie viridibus glabris dorso albo incanis, foliolis argute serratis terminali ovato, floribus paucis corymbosis, sepalis ovatis acuminatis dorso albo-incanis, petalis oblongis, fructu globoso carpellis multis parvis.

A shrub, with slender terete glabrous old stems, with distant very small falcate equal prickles, entirely without glandular setæ. Stipules minute, lanceolate; petiole about $\frac{1}{2}$ in. long; upper leaves simple; lower pinnately trifoliolate; leaflets moderately firm in texture, green and glabrous above, clothed with thin white tomentum beneath, the end one $\frac{1}{2}$–$\frac{3}{4}$ in. long, sharply irregularly serrated. Flowers few, corymbose, with long erect pedicels. Sepals $\frac{1}{4}$ in. long, simple, acuminate. Petals oblong-spathulate, a little longer than the sepals. Fruit-carpels oblique oblong, glabrous, with a glabrous erect style from the inner edge and capitate stigma.—Central Madagascar, *Baron* 1815! Allied to the well-known Asiatic and Australian *R. parvifolius*, L.

ALCHEMILLA BIFURCATA, *Hilsen. et Bojer MSS.*

Perennis, caulibus dense sericeis, foliis breviter petiolatis orbiculatis profunde palmatim 7fidis firmulis facie glabris dorso persistenter sericeis, racemis axillaribus pedunculatis paucifloris laxis, bracteis minutis palmatim fissis, calycis dentibus 4 deltoideis quam tubus paulo brevioribus, bracteis minutis lanceolatis, staminibus 4, fructu carpello solitario.

A perennial herb, with simple or branched densely silky stems a foot long. Petiole not more than $\frac{1}{4}$–$\frac{1}{2}$ in. long; stipules $\frac{1}{6}$ in. long, scariose, with lanceolate free points; blade orbicular, about an inch broad, firm in texture, bright green and glabrous on the upper surface, densely clothed with whitish persistent adpressed silky hairs beneath, deeply palmately cut into 7 lobes, of which the three upper are oblanceolate, obtuse, sharply toothed in the upper half, and the four others smaller, lanceolate and subentire. Flowers few, in lax axillary racemes on long peduncles; lower solitary, shortly peduncled in the axils of small palmately cleft bracts; upper 3–4 aggregated. Flower-calyx silky, a line long; segments 4, deltoid, nearly as long as the tube; bracts of the epicalyx 4, lanceolate, smaller than the calyx-segments. Stamens 4, minute, inserted at the throat of the calyx-tube. Fruit-carpel solitary, placed near the base of the tube.—Mountains of the province of Imerina, *Bojer*! *Baron* 2045! Resembles most *A. alpina* in habit and pubescence. *A. madagascariensis*, recently described by Dr. Hoffmann in 'Reliquiæ Rutenbergianæ,' part v. 336, was also gathered by Hilsenberg and Bojer and distributed by them under the name of *A. potentilloides*, and has also been found by Mr. Baron, no. 845.

ALCHEMILLA SCHIZOPHYLLA, n. sp.

Perennis, dense sericea, caulibus gracillimis decumbentibus, stipulis bifidis persistentibus, foliis petiolatis orbicularibus palmatifidis segmentis linearibus acutis uninerviis, floribus laxe racemosis, calycis dentibus 4 quam tubus 2–3plo brevioribus, carpello solitario maturo ovoideo.

A much branched perennial herb, densely silky in all its parts, with slender decumbent stems. Stipules large, bifid, persistent; petiole very short; leaves $\frac{1}{4}$–$\frac{1}{3}$ in. broad, cut into 12–15 linear acute one-nerved segments. Racemes 1–2 in. long, very lax, 6–8-flowered, with very short pedicels and persistent palmatifid bracts. Calyx $\frac{1}{8}$ in. long, with a funnel-shaped tube, the bract of the epicalyx lanceolate, the inner deltoid. Fruit-carpel solitary, ovoid, lenticular, placed low down in the calyx-tube.—Central Madagascar, *Baron* 1859! Allied to *A. pedata* and *A. Rutenbergii.*

WEINMANNIA FLORIBUNDA, n. sp.

Arborea, ramulis pilosis, foliis brevissime petiolatis simplicibus (raro digitatim trifoliolatis) obovatis obtusis inciso-crenatis, floribus in spicas copiosas axillares et terminales dispositis, rhachibus pubescentibus, calycis segmentis oblongis obtusis, petalis oblongo-spathulatis calyce sesquilongioribus, staminibus 10 exsertis, ovario piloso.

An erect shrub, with crowded pilose slender terete woody pilose branchlets. Leaflets 1–3, rigidly coriaceous, usually deltoid at the base, 1–1$\frac{1}{4}$ in. long, conspicuously crenate, glabrous except the midrib beneath, which is finely pilose, the main veins distinct, erecto-patent, reddish. Flowers densely fascicled, mainly at the tip of the branches, in erecto-patent shortly-peduncled spikes about 2 in. long, with a finely pilose axis. Calyx minute, with 5 oblong obtuse segments twice as long as the tube. Petals oblong, obtuse, $\frac{1}{12}$ in. long. Stamens twice as long as the petals; anthers minute, orbicular. Ovary densely pilose, with two curved glabrous styles.—Central Madagascar, *Baron* 1674!

CRASSULA NUMMULARIÆFOLIA, n. sp.

Annua, glabra, caulibus gracilibus decumbentibus ad nodos inferiores radicantibus, foliis breviter petiolatis suborbicularibus parvis integris, floribus 5–6meris solitariis breviter pedunculatis, calycis segmentis lanceolatis basi connatis, petalis albidis acutis quam calyx paulo longioribus, staminibus inclusis, carpellis fructiferis petalis subæquilongis.

An annual herb, glabrous in all its parts, with very slender trailing stems $\frac{1}{2}$–1 ft. long, rooting at the lower nodes. Petioles very short, dilated and connate at the base; leaves opposite; blade fleshy, green, broad ovate or suborbicular, obtuse or subacute, $\frac{1}{4}$–$\frac{1}{2}$ in. long and broad. Flowers solitary, axillary and terminal; peduncle slender, shorter than the calyx. Calyx campanulate, $\frac{1}{8}$ in. long; segments lanceolate, acute, joined at the base. Petals lanceolate, half as long again as the calyx. Stamens shorter than the petals, with flattened filaments and small oblong anthers. Fruit-carpels glabrous, ⅛ in. long, the ovary narrowed into a short style.—Central Madagascar at Andrangaloaka, in grassy places in the forest, *Parker*! *Baron* 511! Adds this large Cape genus to the Madagascar flora. A near ally of the well-known *C. centauroides*, Linn.; Bot. Mag. tab. 1765.

BRYOPHYLLUM CRENATUM, n. sp.

Perennis, erecta, glabra, foliis oppositis oblongis conspicue crenatis inferioribus majoribus crenatis, superioribus sensim minoribus, cymis paucifloris laxifloris terminalibus, calyce oblongo inflato dentibus deltoideis, corollæ tubo ampullæformi quam calyx paulo longiore, limbi segmentis parvis rubris orbiculari-cuneatis, staminibus supra medium corollæ tubi insertis antheris minutis, stylo ovario æquilongo vel paulo longiore.

A glabrous succulent perennial, with slender terete stems 2–3 feet long, erect or decumbent towards the base. Leaves distant, opposite, oblong, green, fleshy, deeply crenate, obtuse, the lower 2–3 in. long, with a petiole 1–1½ in. long, the upper growing gradually smaller and more remote. Flowers in a lax terminal compound corymbose cyme, on slender erect pedicels ½–1 in. long. Calyx oblong, inflated, membranous, reddish, ½–¾ in. long, ⅓ in. in diam., with 4 deltoid segments about a third as long as the tube. Calyx with an ampulliform tube rather longer than the calyx and 4 orbicular-deltoid crimson segments $\frac{1}{12}$ in. long and broad. Filaments ¼ in. long, inserted above the middle of the corolla-tube; anthers minute, orbicular. Fruit-carpels with narrowly ampulliform contiguous ovaries ¼ in. long and slender styles about ⅓ in. long.—Central Madagascar, *Lyall* 38! and now regathered by Mr. Baron, 608! 956! 1121! 1411! He has also rediscovered *B. proliferum*, Bowie (Baron 1270, 1465), figured in Bot. Mag. t. 5847, the most striking species of the genus.

KALANCHOE PUMILA, n. sp.

Perennis, glabra, pumila, caulibus simplicibus erectis, foliis oppositis obovatis obtusis profunde crenatis sessilibus basi deltoideis, floribus in paniculas densas terminales corymbosas dispositis, pedicellis glabris calyce longioribus, calycis tubo brevissimo segmentis lanceolato-deltoideis, corollæ segmentis lanceolatis tubo oblongo longioribus, staminibus ad faucem insertis, stylo brevi.

An erect glabrous perennial, with simple erect stems not more than 2–3 in. long. Leaves opposite, crowded, decussate, sessile, under an inch long. Flowers in a dense terminal corymbose panicle 1½–2 in. in diam. Calyx ⅛ in. long, glabrous, with a very short tube and 4 deltoid-lanceolate acuminate segments. Corolla ½ in. long, apparently red. Filaments ⅛ in. long, with small orbicular anthers. Fruit-carpels ¼ in. long, narrow, tipped by the short styles.—Central Madagascar, *Baron* 2117!

KALANCHOE TRICHANTHA, n. sp.

Erecta, elata, foliis inferioribus magnis sessilibus oppositis oblongo-spathulatis acutis serratis glabris, floribus in paniculas densas multifloras terminales corymbosas aggregatis, pedicellis brevissimis pilosis, calycis pilosi campanulati segmentis deltoideis quam tubus duplo brevioribus, corollæ luteæ pubescentis segmentis orbicularibus quam tubus quadruplo brevioribus, staminibus biseriatis, stylo elongato.

An erect perennial, with slender terete stems. Leaves opposite, sessile, thick and fleshy in texture, green and glabrous on both surfaces, the lower ones reaching a length of 5–6 inches, 1½–2 in. broad at the middle, acute, sharply and irregularly dentate above the spathulate lower third; upper leaves very distant and very small, entire. Flowers in a very dense corymbose terminal panicle 1–2 in. in diam.; peduncles and pedicels pilose; bracts minute. Calyx ⅙ in. long, pilose, with a campanulate tube and 4 small deltoid teeth. Corolla ⅓ in. long, with a cylindrical tube ⅛ in. in diam. and 4 orbicular segments. Stamens 8, biseriate, the inner 4 inserted above the middle of the corolla-tube, with filaments $\frac{1}{12}$ in. long; outer 4 inserted near the throat of the tube, with very short filaments; anthers minute, orbicular. Styles filiform, ⅓ in. long, reaching to the top of the corolla-tube.—Central Madagascar, *Baron* 977!

KITCHINGIA PELTATA, n. sp.

Perennis, erecta, glabra, foliis petiolatis ovatis obtusis peltatis obscure crenulatis, floribus multis in paniculam terminalem ramis corymbosis dispositis, pedicellis gracilibus elongatis, calycis tubo brevi segmentis semiorbicularibus, corollæ magnæ rubræ tubo oblongo segmentis parvis orbicularibus, staminibus supra medium tubi insertis filamentis brevibus, stylo quam ovarium 3–4plo longiore.

An erect perennial herb, several feet high, glabrous in all its parts. Lower leaves with a petiole 2–3 in. long attached about half an inch above the base of the blade, and an ovate obscurely crenate fleshy blade 3–4 in. long, rounded at the base and apex. Flowers in a long terminal panicle half a foot broad, with corymbose branches and filiform pedicels ½–1 in. or more in length. Calyx campanulate, ⅛ in. long, with 4 orbicular segments as long as the tube. Corolla bright red, 1–1$\frac{1}{4}$ in. long, with an oblong tube $\frac{1}{3}$–$\frac{1}{2}$ in. in diam. and 4 small orbicular segments. Stamens 8, inserted above the middle of the corolla-tube, with filiform filaments $\frac{1}{6}$ in. long and minute reniform anthers with divaricating oblong lobes. Ovaries 4, ovoid, divergent, $\frac{1}{4}$ in. long in the fruiting-stage, with filiform styles nearly an inch long.—Central Madagascar, *Baron*! Forest of Andrangaloaka, *Dr. Parker*! A very fine plant, closely resembling the original *K. gracilipes* in flowers and inflorescence.

KITCHINGIA PARVIFLORA, n. sp.

Perennis, erecta, glabra, foliis caulinis sessilibus oblongo-lanceolatis obtusis crenatis, floribus in cymam compositam terminalem dispositis, pedicellis brevibus, calycis tubo campanulato segmentis semiorbicularibus, corollæ luteæ tubo oblongo segmentis ovatis, staminibus infra tubi medium insertis antheris orbicularibus, stylo quam ovarium longiore.

An erect perennial herb, glabrous in all its parts, with stiff simple stems a foot long. Leaves in pairs $\frac{1}{2}$–1 in. apart along the lower half of the stem, decussate, erecto-patent, fleshy, obtuse, distinctly crenate, the lower 2–3 in. long, the upper growing gradually smaller and more remote. Flowers numerous, in a corymbose terminal compound cyme 1$\frac{1}{2}$–2 in. in diam.; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in. Calyx campanulate, $\frac{1}{6}$ in. long, with a short tube and 4 semiorbicular segments. Corolla yellow, under $\frac{1}{2}$ in. long, with an oblong tube and 4 obtuse segments one third as long as the tube. Stamens 8, inserted below the middle of the corolla-tube, with filiform filaments $\frac{1}{6}$ in. long and small orbicular anthers. Ovaries 4, ovoid, $\frac{1}{8}$ in. long; styles divergent, longer than the ovary; stigma capitate.—Central Madagascar, *Baron* 1191!

KITCHINGIA PANDURIFORMIS, n. sp.

Perennis, erecta, glabra, foliis caulinis sessilibus panduriformibus obtusis crenatis, floribus in paniculam terminalem ramis densifloris corymbosis dispositis, pedicellis flori subæquilongis, calycis parvi tubo campanulato segmentis semiorbicularibus, corollæ tubo oblongo segmentis suborbicularibus, staminibus ad tubi corollæ medium insertis, stylo quam ovarium paulo longiore.

A glabrous perennial herb, with stiff simple erect stems. Leaves numerous along the lower part of the stem, in pairs 1–1$\frac{1}{2}$ in. apart, sessile, ascending, oblong-panduriform, obtuse, fleshy, 4–5 in. long, crenate, subamplexicaul. Flowers very numerous, arranged in a broad terminal panicle with dense-flowered corymbose branches and a long naked peduncle. Calyx campanulate, glabrous, $\frac{1}{8}$ in. long, with a short tube and 4 suborbicular segments. Corolla reddish, under $\frac{1}{2}$ in. long, with an oblong tube $\frac{1}{4}$ in. in diam. and 4 suborbicular spreading segments. Stamens inserted at the middle of the corolla-tube, with filiform filaments $\frac{1}{6}$ in. long and small reniform anthers. Carpels as long as the corolla in the fruiting-stage, diverging; style $\frac{1}{4}$ in. long.—Central Madagascar, *Baron* 436!

KITCHINGIA PORPHYROCALYX, n. sp.

Perennis, glabra, caulibus decumbentibus, foliis oppositis obovatis obtusis serratis sessilibus, floribus in paniculam terminalem paucifloram ramis corymbosis dispositis, pedicellis calyce longioribus, calycis laxi tubo brevissimo segmentis orbicularibus mucronatis, corollæ rubræ tubo infundibulari segmentis deltoideis, staminibus supra medium tubi insertis filamentis brevibus, antheris orbicularibus minutis, stylis carpellis æquilongis.

A fleshy perennial, glabrous in all its parts, with stout simple decumbent stems above a foot long. Leaves opposite, sessile, decussate, 1–$1\frac{1}{2}$ in. long, very obtuse, deltoid at the base, thick in texture, distinctly inciso-crenate, green and glabrous on both surfaces. Flowers in a lax terminal panicle with corymbose branches; pedicels slender, under $\frac{1}{2}$ in. long; bracts minute, falling before the flowers expand. Calyx $\frac{1}{8}$ in. long, $\frac{1}{3}$ in. in diam.; tube very short; segments orbicular, with a distinct mucro. Corolla $\frac{3}{4}$–$\frac{7}{8}$ in. long, with a funnel-shaped tube $\frac{1}{4}$–$\frac{1}{3}$ in. in diam. and 4 deltoid segments. Stamens inserted above the middle of the corolla-tube; filaments rather flattened, under $\frac{1}{4}$ in. long; anthers minute, orbicular, just protruded from the corolla-tube. Fruit-carpels subcylindrical, $\frac{1}{3}$ in. long, narrowed gradually into filiform styles of the same length.—Central Madagascar, *Baron* 1708!

KITCHINGIA AMPLEXICAULIS, n. sp.

Perennis, glabra, caulibus erectis simplicibus, foliis oppositis oblanceolatis obtusis crenatis cordato-amplexicaulibus, floribus in paniculas amplas terminales ramis corymbosis dispositis, pedicellis calyce longioribus, bracteis minutis lanceolatis, calycis tubo brevissimo, segmentis ovatis, corollæ rubræ segmentis orbicularibus quam tubus infundibularis quadruplo brevioribus, staminibus infra medium tubi insertis, filamentis elongatis, antheris orbicularibus minutis, stylis quam carpelli longioribus.

A glabrous succulent perennial, with stiffly erect unbranched stems $1\frac{1}{2}$–2 ft. long. Leaves erecto-patent, in distant decussate pairs, the longer ones 5–6 in. long, 1–$1\frac{1}{4}$ in. broad, those near the panicle much smaller. Flowers in a dense corymbose panicle

3–4 in. broad; pedicels slender, about $\frac{1}{4}$ in. long. Calyx $\frac{1}{8}$ in. long, with 4 segments reaching down nearly to the base. Corolla above $\frac{1}{2}$ in. long, with a funnel-shaped tube $\frac{1}{8}$–$\frac{1}{6}$ in. in diam. and 4 orbicular segments. Stamens 8, inserted below the middle of the corolla-tube; filaments $\frac{1}{3}$ in. long; anthers minute, orbicular, just protruded from the corolla-tube. Fruit-carpels $\frac{1}{4}$ in. long; filiform styles a little longer.—Central Madagascar, at Ankerimadinika in the province of Imerina, *Baron* 1452!

DICORYPHE VITICOIDES, n. sp.

Ramulis stellato-pilosis, foliis alternis brevissime petiolatis orbiculato-oblongis obtusis subcoriaceis utrinque viridibus glabris, stipulis parvis oblanceolatis foliaceis persistentibus, floribus pluribus terminalibus sessilibus fasciculatis, calyce infundibulari piloso deorsum sulcato dentibus parvis, petalis nigrescentibus oblanceolatis breviter exsertis, staminibus 10, alternis anantheris, ovario apice libero piloso stylis 2 brevibus.

An erect much-branched shrub or tree, with slender woody branchlets, densely clothed with brown stellate pubescence. Petiole $\frac{1}{6}$–$\frac{1}{4}$ in. long; stipules oblanceolate unguiculate, $\frac{1}{4}$–$\frac{1}{3}$ in. long, persistent, just like the leaves in texture; lamina 2–3 in. long, 1$\frac{1}{2}$–2 in. broad, obtuse, broadly rounded at the base, firm in texture, green and glabrous on both surfaces, with about 4 pairs of raised erecto-patent main veins. Flowers 5–6 in terminal clusters. Calyx $\frac{1}{3}$ in. long, plicate towards the base, densely clothed with brown stellate pubescence; teeth small, deltoid. Petals inserted low down in the calyx-tube, $\frac{1}{3}$ in. long, nearly black, with tufts of stellate hairs on the outside. Fertile stamens as many as the petals and about as long; staminodia filiform, alternate with the stamens and petals. Ovary free at the top, densely pilose, with two short styles.—Central Madagascar, *Baron* 1881! Mr. Baron has also refound *D. stipulacea*, St.-Hil. (1161), of which we had no previous specimens.

MYOSURANDRA MOSCHATA, *Baill. Adans.* ix. tab. 8.

Mr. Baron sends fine specimens (2089!) of this curious plant. The only other known species of the genus was gathered by Welwitsch in Angola. We have previously had it from Dr. Parker under the native name of *Riadriatra*, and long ago from Hilsenberg and Bojer under the name of *Anthospermum plicatum*.

EUGENIA (§ SYZYGIUM) MICROPODA, n. sp.

Arborea, glabra, foliis brevissime petiolatis parvis obovatis obtusis vel

obscure cuspidatis basi deltoideis rigidis venis faciei inferioris conspicuis, floribus in paniculam corymbosam terminalem aggregatis pedicellis brevibus, calycis tubo cuneato limbo obscure dentato, alabastro semigloboso, staminibus circiter 30 calyci æquilongis.

A much-branched erect shrub, glabrous in all its parts. Leaves nearly sessile, obovate, $\frac{1}{2}$–1 in. long, $\frac{3}{8}$–$\frac{3}{4}$ in. broad, obtuse or obscurely cuspidate, deltoid at the base, very thick and rigid in texture, the veins of the under surface moderately conspicuous. Flowers in dense corymbose terminal panicles, with short pedicels. Calyx $\frac{1}{12}$ in. long, with a deltoid tube and obscurely-toothed collar-like limb. Stamens as long as the calyx.—Central Madagascar, *Baron* 388!

EUGENIA (§ SYZYGIUM) PARKERI, n. sp.

Arborea, glabra, foliis petiolatis oblongis obtusis basi deltoideis crassis rigidis venis inconspicuis immersis, floribus in paniculam densam terminalem aggregatis, pedicellis nullis, calycis tubo cuneato limbo 5-dentato dentibus deltoideis, alabastro semigloboso, staminibus 30–40 calyci æquilongis.

A forest-tree, with terete pale wooded branchlets, glabrous in all its parts. Leaves shortly petioled, oblong, obtuse, cuneate at the base 1$\frac{1}{2}$–2 in. long, very thick and rigid in texture; the veins on both surfaces fine and inconspicuous. Flowers in dense terminal panicles about 2 inches in diameter; cymes few-flowered, umbellate, without any pedicels. Calyx nearly $\frac{1}{4}$ in. long, black, coriaceous, with an infundibuliform tube and campanulate limb with 5 deltoid teeth. Petals suborbicular. Stamens as long as the calyx.—Central Madagascar, *Dr. Parker*! Native name *Marotampona*.

EUGENIA (§ SYZYGIUM) CUNEIFOLIA, n. sp.—Syzygium cuneifolium, *Bojer MSS.*

Glabra, foliis breviter petiolatis obovatis cuspidatis basi cuneatis rigidis venis utrinque pulchre exsculptis, floribus in paniculam terminalem densam aggregatis, pedicellis nullis, calycis tubo cuneato limbo subintegro, alabastro semigloboso, staminibus circiter 30 calyci æquilongis.

A very much-branched erect shrub or small tree, glabrous in all its parts. Leaves distinctly petioled, obovate, about an inch long, obtusely cuspidate, cuneate at the base, very thick and rigid in texture, the veins on both surfaces raised and conspicuous. Flowers in dense terminal corymbose panicles 1$\frac{1}{2}$–2 in. in diam.; cymes umbellate, without any pedicels. Calyx $\frac{1}{8}$ in. long, with a deltoid tube and subentire spreading collar-like limb.

Unexpanded corolla subglobose. Stamens about 30, as long as the calyx.—Central Madagascar, *Baron* 1254! Hivondro near Tamatave, 15 feet high, *Dr. Meller*! Gathered previously by Bojer and Curtis, and named in manuscript by the former. Very near the common Mauritian *E. glomerata*, Lam., from which it differs by its cuspidate leaves with raised veins and sessile larger flowers.

EUGENIA (§ SYZYGIUM) EMIRNENSIS, n. sp.

Glabra, foliis breviter petiolatis obovatis obtusis rigidis basi cuneatis subtiliter venulosis, floribus in paniculam terminalem densam corymbosam aggregatis, pedicellis nullis, calycis tubo cuneato limbo subintegro, alabastro semigloboso, staminibus circiter 30 calyci æquilongis.

A shrub or small tree, glabrous in all its parts. Leaves shortly petioled, obovate, obtuse, 1–1½ in. long, deltoid at the base, very rigid in texture, the veins on both surfaces fine and indistinct. Flowers very numerous, in a dense rounded terminal panicle about 2 in. broad; cymes umbellate, without any pedicels. Calyx ⅛ in. long, with a cuneate tube and nearly entire limb. Bud subglobose. Stamens about 30, as long as the calyx. Style finally about ⅛ in. long. Fruit globose, the size of a large pea, crowned by the persistent calyx.—Central Madagascar, *Baron* 1076! 1932!

EUGENIA (§ SYZYGIUM) PHILLYREÆFOLIA, n. sp.

Arborea, glabra, foliis petiolatis oblongis rigidis acutis subtiliter venosis, floribus in paniculam densam terminalem corymbosam aggregatis, pedicellis brevissimis, calycis tubo cuneato limbo subintegro, alabastro semigloboso, staminibus circiter 30 calyci æquilongis.

A much-branched small tree, glabrous in all its parts. Leaves distinctly petioled, 1½–2 in. long, narrowed gradually to an obtuse point, deltoid at the base, rigid in texture, the veins close and but little raised. Flowers in dense terminal panicles 2–3 inches in diameter; cymes many-flowered, umbellate, with short pedicels. Calyx ⅛ in. long, with an infundibuliform tube and a subentire collar-like limb. Bud $\frac{1}{12}$ in. in diameter. Stamens as long as the calyx.—Central Madagascar, *Baron* 958! This and the five other species here described are all near neighbours of the Mauritian *E. glomerata*.

EUGENIA (§ SYZYGIUM) VACCINIIFOLIA, n. sp.

Glabra, ramosissima, foliis parvis petiolatis obovatis obtusis subcoriaceis, floribus in paniculas terminales ramis corymbosis paucifloris dispositis,

pedicellis calyci æquilongis vel longioribus, floribus pro stirpe magnis, calycis tubo cuneato dentibus perspicuis rotundatis, petalis orbicularibus calyci æquilongis, staminibus permultis quam calyx duplo longioribus.

A much-branched shrub, glabrous in all its parts. Petiole $\frac{1}{8}$–$\frac{1}{6}$ in. long; blade subcoriaceous, $\frac{3}{4}$–1 in. long, very obtuse, deltoid at the base, green and glabrous on both surfaces, with fine erecto-patent main veins beneath, anastomosing in arches just within the margin. Flowers in rather lax terminal corymbose panicles $1\frac{1}{2}$–2 in. broad; pedicels $\frac{1}{8}$–$\frac{1}{4}$ in. long, with minute caducous lanceolate membranous bracteoles. Calyx $\frac{1}{6}$ in. broad, with a deltoid tube and 5 semiorbicular teeth. Petals orbicular, $\frac{1}{6}$ in. long and broad. Stamens 50 or more, unequal, $\frac{1}{4}$ in. long, with filiform filaments and minute orbicular anthers.—Central Madagascar, *Baron* 1919!

VEPRECELLA VESTITA, n. sp.

V. ramulis tetragonis dense pilosis, foliis longe petiolatis orbicularibus cordatis obtusis denticulatis 9-nerviis facie scabris dorso dense brunneo-pilosis, floribus in paniculam laxifloram paucifloram terminalem dispositis, pedicellis elongatis, calycis tubo campanulato piloso, limbo obscure quinquedentato, petalis magnis purpureis, antheris conformibus lineari-oblongis basi inappendiculatis, fructu 4-loculari quam calyx duplo longiore.

An erect shrub or tree, with stout square woody branchlets, densely clothed with persistent short pale brown pubescence. Petiole 2–3 in. long, densely pilose; blade 4–5 in. long and broad, cordate at the base, distinctly 9-nerved from base to apex, thick in texture, very scabrous above, densely ferrugineo-pilose, with distinct raised cross bars between the main veins. Panicle terminal, half a foot long and broad; pedicels sometimes an inch long. Calyx with a campanulate tube $\frac{1}{4}$–$\frac{1}{3}$ in. long and broad, and a collar-like limb with 5 angles and 5 indistinct teeth. Petals bright purple, obovate, $\frac{1}{2}$ in. long. Stamens 10, a little shorter than the petals, uniform, with linear-oblong anthers $\frac{1}{6}$ in. long, with a strap-shaped connective. Capsule semiorbicular, $\frac{1}{3}$ in. broad, flat at the top, free from the calyx in the upper half, splitting into four shining pale-brown woody valves. Seeds very numerous, straight, minute, clavate.—Central Madagascar, in forests of the province of Imerina, *Baron* 1281!

DICHÆTANTHERA CORDIFOLIA, n. sp.

D. ramulis dense hispidis, foliis distincte petiolatis late oblongis obtusis cordatis serrulatis quinquenerviis facie scabris dorso dense pilosis, floribus in paniculam laxam deltoideam terminalem dispositis, calycis intense

hispidi tubo campanulato dentibus 4 deltoideis, petalis purpureis obovatis, staminibus quam petala longioribus antheris basi conspicue bifurcatim caudatis.

An erect shrub, with square woody branchlets, densely clothed with short spreading brown bristly hairs. Petiole $\frac{1}{2}$ in. long; blade 2–3 in. long, $1\frac{1}{2}$–2 in. broad, very obtuse, distinctly 5-nerved from base to apex, dark green and scabrous with short bristles above, pale green and densely pilose beneath, with distinct raised cross bars between the principal veins. Flowers in a lax deltoid terminal panicle, the lower branches of which spring from the axils of fully developed leaves; pedicels sometimes $\frac{1}{2}$ in. long, densely hispid. Calyx $\frac{1}{4}$ in. long, densely hispid, with a large campanulate tube and 4 small subobtuse deltoid teeth. Petals $\frac{1}{3}$ in. long. Stamens 8, with a linear-oblong anther $\frac{1}{5}$ in. long, the connective filiform for the same length below the cells and furnished with a long spur with linear-setaceous forks. Style filiform, nearly $\frac{1}{2}$ in. long.—Between Tamatave and Antananarivo, *Dr. Meller*!

DICHÆTANTHERA OBLONGIFOLIA, n. sp.

D. ramulis hispidis, foliis distincte petiolatis oblongis subcoriaceis serrulatis quinquenerviis utrinque obscure hispidulis, floribus in paniculam terminalem paucifloram corymbosam dispositis, calycis tubo campanulato setis brevissimis scabro segmentis 4 inconspicuis, petalis 4 orbicularibus, staminibus inæqualibus basi in caudam bifurcatam productis, stylo elongato, fructu capsulari 4-loculari.

A much-branched erect shrub or tree, with shortly hispid quadrangular woody branchlets, with conspicuous swollen nodes. Petiole $\frac{1}{4}$ in. long; blade 2–3 in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. broad at the middle, obtuse, rather rounded at the base, distinctly 5-nerved from base to apex, dark green, with very short distant bristles above, pale green with minute paleaceous bristles beneath. Flowers in corymbose terminal panicles; pedicels $\frac{1}{8}$–$\frac{1}{6}$ in. long, with a pair of minute deltoid bracteoles at the middle. Calyx campanulate, $\frac{1}{8}$–$\frac{1}{6}$ in. broad. Petals orbicular unguiculate, $\frac{1}{6}$ in. long and broad. Stamens 8, the largest with linear-oblong corrugated anthers $\frac{1}{8}$ in. long, the connective produced $\frac{1}{8}$ in. below the cells and furnished at the base with a bifurcate tail. Fruit a capsule $\frac{1}{8}$ in. long, splitting up into 4 valves.—Central Madagascar, *Baron*!

DICHÆTANTHERA ARBOREA, n. sp.

Arborea, ramulis hispidis, foliis distincte petiolatis oblongo-lanceolatis

acutis utrinque hispidis, floribus in paniculam amplam laxam terminalem dispositis, calycis tubo campanulato setoso segmentis parvis semiorbicularibus, petalis 4 orbicularibus, staminibus 8 subæqualibus antheris omnibus basi in caudam bifurcatam productis, stylo elongato stigmate clavato, capsulis dimidio superiore exsertis.

A forest-tree 20–30 feet high, with hispid subtetragonous branchlets. Petiole $\frac{1}{2}$ in. long; blade triplinerved, 2–4 in. long, 1–1$\frac{1}{2}$ in. broad at the middle, dark green above, pale green beneath, slightly hispid on both surfaces. Flowers in a lax terminal panicle $\frac{1}{2}$ ft. long and broad, with erecto-patent branches and a whorl of stout bristles at each of the nodes; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in. Calyx with a campanulate densely bristly tube $\frac{1}{6}$ in. in diam. and 4 small rounded segments. Petals 4, orbicular unguiculate, $\frac{1}{3}$ in. long, ciliated. Stamens 8, with anthers $\frac{1}{6}$ in. long, with a single apical pore and two long bifurcate tails. Style nearly $\frac{1}{2}$ in. long. Capsule exserted from the ovary and splitting up into four valves.—Central Madagascar, *Baron* 391! Forest of Andrangaloaka, *Dr. Parker*!

MEDINILLA FASCICULATA, n. sp.

Glabra, ramulis parce papillosis, foliis breviter petiolatis oblongis obtusis rigide coriaceis supra basin trinervatis basi deltoideis, cymis axillaribus fasciculatis 1–4-floris, pedicellis brevibus ascendentibus, calycis tubo campanulato ore subintegro, staminibus inclusis.

An erect shrub, glabrous in all its parts, the ultimate branchlets distinctly tetragonous. Leaves opposite; petiole $\frac{1}{8}$–$\frac{1}{6}$ in. long; blade 1$\frac{1}{2}$–2 in. long, $\frac{3}{4}$–1 in. broad, very thick and rigid in texture, obtuse, deltoid at the base, distinctly three-nerved a short space above the base. Cymes axillary, fascicled, not more than $\frac{1}{2}$ in. long including the short peduncle; pedicels $\frac{1}{8}$–$\frac{1}{6}$ in. long, with 2–4 red deltoid membranous bracteoles a short space from the flower. Calyx $\frac{1}{8}$ in. long and broad, with a narrow entire collar-like limb. Petals deltoid, as long as the calyx.—Central Madagascar, *Baron*!

MEDINILLA PAPILLOSA, n. sp.

Glabra, ramulis conspicue copiose tuberculatis, foliis oppositis brevissime petiolatis obtusis rigide coriaceis supra basin trinervatis basi deltoideis, cymis axillaribus paucifloris breviter pedunculatis, pedicellis ascendentibus, quam flos 3–4plo longioribus, calycis tubo infundibulari ore integro, petalis parvis deltoideis, antheris basi haud appendiculatis.

A shrub, glabrous in all its parts, with woody branchlets furnished with copious conspicuous papillæ. Leaves opposite, nearly sessile, 1–1½ in. long, ¾–1 in. broad, very thick and rigid in texture, furnished with three distinct ribs a little above the base, very obtuse, distinctly emarginate at the tip, deltoid at the base. Cymes axillary, binate, 2–4-flowered, with short slender peduncles; pedicels ascending, slender, bright red, ½–¾ in. long, papillose; furnished with a pair of minute bracteoles ⅛–⅙ in. from the calyx. Calyx ⅛ in. long and broad, glabrous, papillose, with a red-tinted entire collar-like limb. Bud conical. Petals 4, as long as the calyx. Stamens 8, included; anthers linear-oblong; filaments short, filiform.—Central Madagascar, *Baron* 1677!

MEDINILLA PARVIFOLIA, n. sp.

Glabra, ramosissima, ramulis conspicue tuberculatis, foliis brevissime petiolatis cordato-oblongis parvis rigide coriaceis obscure trinervatis apice emarginatis, cymis axillaribus paucifloris pedunculatis folio æquilongis, pedicellis brevibus, calycis tubo campanulato, limbo obscure dentato.

A much-branched erect shrub, glabrous in all its parts; the slender tetragonous branchlets furnished with copious papillæ. Leaves opposite, nearly sessile, ½–¾ in. long, distinctly emarginate at the apex and cordate at the base, moderately thick in texture, the two side nerves not distinctly marked. Cymes binate, axillary, 5–6-flowered, about as long as the leaves, the slender erect peduncles about ½ in. long; pedicels erect, ⅛–¼ in. long, with a pair of lanceolate bracteoles a short space from the flower. Calyx with a campanulate tube ⅛ in. broad and long and narrow collar-like limb. Petals and stamens not seen.—Central Madagascar, *Baron*!

MEDINILLA DIVARICATA, n. sp.

Glabra, ramulis parce papillosis, foliis brevissime petiolatis oblongis acutis basi late rotundatis subcoriaceis supra basin trinervatis, cymis axillaribus multifloris ramis divaricatis, pedicellis brevibus, calycis tubo campanulato limbo integro, petalis obtusis, antheris oblongis basi caudatis.

A much-branched erect shrub, glabrous in all its parts, the ultimate branchlets distinctly 4-angled. Leaves opposite, with a very short petiole and a blade much thinner in texture than in *M. papillosa* and *fasciculata*, almost cordate, narrowed gradually to an acute point, 2–2½ in. long, ¾–1 in. broad, with three distinct ribs a little above the base. Cymes copious, fascicled, axillary, much shorter than the leaves, with spreading main branches; pedicels sometimes shorter than the calyx, with a pair of minute deltoid green bracteoles a short space from the calyx.

Calyx green, glabrous, $\frac{1}{8}$ in. long and broad, with a campanulate tube and a narrow entire collar-like limb. Bud globose; the petals rather longer than the calyx. Anthers small, oblong, $\frac{1}{2}$ line long, with the connective produced into a short hooked spur at the base. Style rather shorter than the petals.—Central Madagascar, *Baron* 1761!

MEMECYLON LONGICUSPE, n. sp.

Glabrum, ramosissimum, ramulis gracillimis tetragonis, foliis oppositis breviter petiolatis ovatis longe acuminatis uninerviis subcoriaceis integris vel obscure denticulatis basi deltoideis, cymis axillaribus 1–4-floris breviter pedunculatis, pedicellis flore brevioribus, calycis tubo deltoideo limbo truncato, petalis deltoideo-cuspidatis calyce longioribus, staminibus inclusis, antheris oblongis basi acutis, fructu nigro duro magnitudine pisi.

A much-branched shrub, glabrous in all its parts, with very slender tetragonous branchlets. Leaves opposite, shortly petioled, 1–1$\frac{1}{2}$ in. long, narrowed from below the middle gradually to a long point, subcoriaceous, dark green on both sides, with no visible veins except the midrib. Cymes copious, axillary, 1–2-nate, erect, 1–4-flowered, about $\frac{1}{2}$ in. long. Calyx $\frac{1}{12}$ in. long, black, glabrous, coriaceous, with a cuneate tube and an entire limb. Petals 4, rather longer than the calyx, deltoid-cuspidate. Stamens nearly as long as the petals, with filiform filaments, and small oblong anthers narrowed into an incurved acute point at the base. Style filiform, as long as the petals. Fruit hard, black, globose, 1-seeded, $\frac{1}{4}$ in. in diam.—Central Madagascar, in forests of the province of Imerina, *Baron* 1288! 1301! 1962!

BEMBICIA AXILLARIS, *Oliver in Hook. Ic. Pl.* tab. 1404.

Central Madagascar, in forests of the province of Imerina, *Baron* 891! 1637! Of this interesting and very distinct new genus of Samydaceæ, a figure and description has been given in Hooker's 'Icones Plantarum.'

HOMALIUM PARKERI, n. sp.

Arborea, glabra, stipulis nullis vel caducis, foliis petiolatis oblongis crenatis coriaceis, floribus parvis in spicas axillares interruptas foliis æquilongas dispositis, bracteis nullis, ovario parvo cuneato pentagono piloso, calycis segmentis brevissimis obtusis, petalis 5 ovato-lanceolatis acutis, staminibus 5 quam petala triplo brevioribus, stylis 3 erectis filamentis æquilongis.

A tree 20–30 feet high, with glabrous branchlets and leaves. Leaves distinctly petioled, 2–3 in. long, subobtuse, conspicuously crenate, deltoid and entire at the base, thick and rigid in texture, with fine parallel erecto-patent main veins. Flowers in interrupted shortly-peduncled spikes 2–3 in. long from the axils of the upper leaves. Ovary pentagonal, cuneate, sessile, ½ line long, with 5 small obtuse segments. Petals 5, rarely 6, ½ line long. Stamens 5, opposite the petals, not more than ⅓ as long. Styles 3, erect, as long as the filaments.—Forest of Andrangaloaka, *Dr. Parker*! Forests of Imerina province, *Baron* 1295! Allied to *H. africanum*, Benth., and *H. longistylum*, Masters. *H. tetramerum*, Baker, in Trimen's Journ. 1882, p. 110, has been refound by Mr. Baron (No. 858); and in his fine set of specimens there are occasionally pentamerous and even hexamerous flowers.

PHARNACEUM SUFFRUTICOSUM, n. sp.

Suffruticosum, glabrum, stipulis scariosis deltoideo-cuspidatis haud laceratis, foliis sessilibus fasciculatis subulatis muticis, pedunculis strictis axillaribus erectis elongatis 1–3-floris, sepalis 5 obovatis obtusis, staminibus 10 calyce brevioribus, fructu ovoideo oblongo 5-loculari calyci æquilongo.

A much-branched shrubby perennial, glabrous in all its parts, with stems under a foot long. Leaves tufted, slender, sessile, erect, subulate, with revolute edges, ½–¾ in. long, not mucronate at the tip; stipules deltoid-cuspidate, white, scariose, persistent, not lacerated. Flowers on copious axillary slender erect simple or forked naked peduncles 2–4 in. long. Calyx ⅛ in. long; sepals 5, obovate, obtuse, imbricated, green, with a white margin. Corolla none. Stamens 10, rather shorter than the sepals, with filiform filaments and minute orbicular anthers. Capsule as long as the calyx, splitting down to the base into 5 loculicidal valves, each cell containing a few small brown cuneate seeds.—Province of Ambongo, *Pervillé*, 647! Adds this well-known characteristically Cape genus to the Madagascar flora.

HYDROCOTYLE (§ CENTELLA) TUSSILAGINIFOLIA, n. sp.

Perennis, late reptans, caulibus gracillimis decumbentibus internodiis longis, foliis ad nodos fasciculatis longe petiolatis cordato-orbicularibus parvis dentatis ciliatis, pedunculis solitariis, umbellis capitatis 2–3-floris, bracteis exterioribus conspicuis oblongis, fructu orbiculari stylis parvis falcatis coronato.

A wide-trailing perennial herb, with very slender stems, at first slightly pilose, sending out tufts of erect leaves from the nodes. Leaves few in a tuft, with pilose petioles ½–1 in. long, with large persistent stipules, and a cordate-orbicular membranous lamina $\frac{1}{4}$–$\frac{1}{3}$ in. broad, with deltoid teeth and a large open basal sinus, pilose mainly on the margin when young, glabrous when mature. Peduncles solitary, simple, shorter than the petioles. Flowers 2–3, sessile in a globose head, the two opposite outer bracts green, oblong, obtuse, nearly as long as the flowers. Flower $\frac{1}{12}$ in. long; ovary oblong; petals 5, red, deltoid, a third as long as the ovary. Fruit orbicular, $\frac{1}{12}$ in. long and broad, laterally compressed, obscurely ribbed, crowned by the small falcate styles, which are cylindrical down to the base.—Central Madagascar, *Baron* 2139! A near ally of the widely spread *H. asiatica*, L.

PIMPINELLA BISECTA, n. sp.

Perennis, erecta, copiose ramosa, foliis plerisque basalibus rosulatis petiolatis pilosis oblongis pinnatis segmentis adnatis profunde serratis, umbellis primariis 3–5-radiatis ebracteatis, umbellulis 3–6-floris bracteolis abortivis vel solitariis minutis, pedicellis quam fructus triplo longioribus, fructu oblongo glabro jugis parum prominulis, stylis brevissimis divaricatis.

A perennial herb, about 2 feet long, with slender much-branched glabrous stems. Leaves nearly all (5–6) in a basal rosette, 3–4 in. long including the winged petiole, pilose, oblong, with several pairs of sessile oblong or lanceolate sharply serrated pinnæ. Stem-leaves none except at the base of the branches, the lower simply pinnate with entire linear segments, the upper simple lanceolate. Umbels of 3–5 rays without any bracts. Umbellules of 3–6 flowers; pedicels finally $\frac{1}{4}$–$\frac{1}{3}$ in. long, with rarely a single minute linear bract to an umbel. Fruit oblong, glabrous, $\frac{1}{8}$ in. long, with three inconspicuous ribs on the rounded back of each mericarp and an oblong commissure. Filiform portion of styles divaricate, not longer than their thickened bases.—Central Madagascar, *Baron* 929!

PIMPINELLA EBRACTEATA, n. sp.

Perennis, erecta, glabra, parce ramosa, foliis basalibus rosulatis deltoideis bipinnatis segmentis ovatis obtusis argute serratis, foliis superioribus segmentis acutis, umbellis primariis 5–6-radiatis, umbellulis 6–8-floris, bracteis bracteolisque nullis, pedicellis elongatis, fructu oblongo glabro jugis parum prominulis, stylis brevissimis divaricatis.

An erect perennial, with slender stems 1–1½ ft. long. Leaves mainly in a basal rosette; petiole 1–1½ in. long; lamina deltoid, bipinnate, 2–3 in. long, moderately firm in texture, green and glabrous on both surfaces; segments sessile, broad ovate, $\frac{1}{4}$–$\frac{1}{3}$ in. long. Stem-leaves usually only from the base of the branches, the upper simply pinnate, with distant linear segments. Primary umbels with peduncles nearly an inch long; pedicels $\frac{1}{4}$–$\frac{1}{3}$ in. Flowers and fruit as in *P. bisecta* and *tenuicaulis*.—Central Madagascar, *Baron* 2048!

PIMPINELLA TENUICAULIS, n. sp.

Perennis, glabra, foliis inferioribus biternatim compositis foliolis ovatis argute serratis, umbellis primariis circiter 5-radiatis bracteis 3–4 minutis linearibus, umbellulis 4–7-floris bracteolis linearibus, pedicellis quam fructus 3–4plo longioribus, fructu oblongo glabro jugis parum prominulis, stylis brevibus divaricatis.

A perennial herb, glabrous in all its parts, with much-branched erect very slender stems 2–3 ft. long. Lower leaves petioled, biternately compound, with ovate serrated leaflets of moderately firm texture about $\frac{1}{2}$ in. long. Primary umbels of about 5 rays, with 3–4 minute linear bracts. Umbels 4–7-flowered; pedicels $\frac{1}{4}$–$\frac{1}{3}$ in. long; bracts several, minute, linear. Fruit oblong, with three inconspicuous ribs on the rounded back; commissural face oblong. Petals minute, white. Filiform upper portion of the styles not longer than the dilated base, divaricating.—Central Madagascar, *Baron* 1238!

PANAX TRIPINNATUS, n. sp.

Glaber, foliis magnis deltoideis tripinnatis foliolis obovatis obtusis ciliato-denticulatis, inflorescentiæ ramis elongatis racemosis, ramulis umbellatis, umbellis 4–8-floris, pedicellis brevibus basi articulatis, ovario globoso triloculari, calycis limbo minute quinquedentato, stylis subulatis recurvatis quam ovarium quadruplo brevioribus.

A shrub, glabrous in all its parts. Leaves 1–1$\frac{1}{2}$ ft. long and broad, deltoid, with 3-jugate main divisions, the leaflets in 2–3 opposite pairs, erecto-patent, sessile or obscurely stalked, deltoid at the base, $\frac{3}{4}$–1 in. long, very obtuse, the end one sessile between the two top side ones; margin obscurely crenate, with a few subulate cilia; texture moderately firm; both surfaces dull green, with only the midrib visible. Branches of the inflorescence 6–9 in. long, with numerous short erecto-patent peduncled simple umbels with a small lanceolate bract at the base of each branch; pedicels $\frac{1}{8}$ in. long. Fruit $\frac{1}{6}$ in. long and broad, 3-lobed, and each of the three lobes conspicuously 3-ribbed, crowned with a minute sharply 5-toothed calyx-limb and three filiform recurved styles nearly a line long. Petals not seen. Seeds much and deeply lobed laterally.—Central Madagascar, *Baron* 1935!

PANAX CISSIFLORUS, n. sp.

Glaber, foliis magnis deltoideis bipinnatis, foliolis 2–3-jugis oblongis acutis parce ciliato-denticulatis, inflorescentiæ ramis parce racemosis, ramulis simpliciter umbellatis, umbellis 5–6-floris, pedicellis flore longioribus, ovario globoso triloculari, calycis limbo minuto subintegro, stylis 3 ad basin liberis.

A shrub, glabrous in all its parts. Leaves a foot long and broad, with two erecto-patent opposite side divisions and an end one; leaflets 5–7 to a division, oblong or obovate-oblong, acute, 2–3 in. long, about an inch broad, moderately firm in texture, no ribs except the midrib distinctly visible. Branches of the inflorescence three in a terminal whorl, half a foot long, bearing each 5–6 peduncled whorls of flowers arranged racemosely; final pedicels slender, about $\frac{1}{4}$ in. long. Ovary globose-trigonous, $\frac{1}{6}$ in. long and broad, crowned by a minute calyx-limb and small globose green corolla. Stamens included. Styles free to the base.—Central Madagascar, *Baron* 1775!

PANAX (§ SPHÆROPANAX) ZANTHOXYLOIDES, n. sp.

Arboreus, glaber, foliis bipinnatis, pinnis 3–4-jugis, centralibus solum parce compositis, foliolis obovatis obtusis rigide coriaceis, floribus in umbellas paniculatas dispositis, umbellis paucifloris, pedicellis basi articulatis quam fructus paulo longioribus, fructu globoso 4–5-angulato 4–5-loculari, stigmatibus 4–5 brevibus patulis.

An erect tree or shrub, glabrous in all its parts, with stiff terete branchlets. Leaves 3–4 in. long, including the 1-in. petiole, which is swollen at the base; rhachis angled; leaflets obovate, obtuse, cuneate at the base, 1–$1\frac{1}{4}$ in. long, firm in texture, green and glabrous on both surfaces, with 4–5-jugate parallel erecto-patent main veins, the 3–4 pinnæ consisting of single leaflets in the less developed leaves, but in the more developed leaves the central pinnæ compound, with 3–5 leaflets. Flowers in small peduncled terminal panicles 2–3 in. long, with short simple erecto-patent 4-angled branches bearing umbels of 3–6 flowers, with pedicels $\frac{1}{8}$–$\frac{1}{6}$ in. long, not dilated into a cup at the tip. Mature ovary globose, 4–5-angled, 4–5-celled, glabrous, $\frac{1}{6}$ in. in diam. Petals and stamens not seen. Stigmas 4–5, forming a star about a line in diameter, thickened downwards and connate at the base.—Central Madagascar, forests of Imerina province, *Baron* 1080! 1300! 1351! This and the next species recede from *Panax* by their 5-celled ovary, and perhaps should constitute a distinct genus; but they are connected with the type by *Maralia* of Thouars and *Oligoscias* of Seemann.

PANAX (§ SPHÆROPANAX) ORNIFOLIUS, n. sp.

Arboreus, glaber, foliis simpliciter pinnatis, foliolis 9–13 inæquilateraliter oblongis vel oblanceolatis obtusis rigide coriaceis remotis sessilibus vel brevissime petiolulatis, floribus in umbellas multas paniculatas dispositis, umbellis multifloris, pedicellis quam flos 3–4plo longioribus apice in cupulam dilatatis, basi articulatis, ovario 5-loculari, calycis limbo integro angusto, stylis brevibus cylindricis erecto-patentibus.

A tree, glabrous in all its parts, with thick ultimate branchlets. Leaves crowded, nearly a foot long, including the petiole, which is an inch long and thickened towards the base; rhachis zigzag; leaflets opposite, nearly or quite sessile, inæquilateral, oblong, obtuse, 2–3 in. long, rigid in texture, entire, green on both surfaces, glossy above, obscurely penninerved, with copious fine erecto-patent veinlets, cuneate at the base, more cut away on the lower side. Flowers in copious lateral and terminal peduncled panicles as long as the leaves, composed of numerous peduncled umbels, of which a number of the top ones spring from the apex of the main peduncle, whilst the others are scattered; peduncles 1–2 in. long; pedicels $\frac{1}{4}$–$\frac{1}{3}$ in. long, strongly angled, cupular at the tip. Petals 5, ovate, greenish-yellow, $\frac{1}{8}$ in. long. Stamens 5, half as long as the petals, with short linear filaments and oblong anthers. Ovary finally oblong, pentagonal, 5-celled, crowned by the narrow collar-like calyx-limb. Styles 5, short, erecto-patent.—Central Madagascar, *Baron* 1187! 1248!

CUSSONIA MONOPHYLLA, n. sp.

Arborea, glabra, petiolo brevi apice articulato, foliis simplicibus oblanceolato-oblongis acutis coriaceis nitidis, paniculæ ramis simpliciter vel bis umbellatis, pedicellis brevibus basi articulatis, umbellis 5–10-floris, ovario globoso 2–4-loculari, calycis limbo subintegro, stylo apice 2–4-cuspidato.

A tree, glabrous in all its parts, with more slender branchlets than in the compound-leaved species. Petiole stout, $\frac{1}{2}$–$\frac{3}{4}$ in. long, articulated at the base of the solitary leaflet, which is 3–4 in. long, 1–1$\frac{1}{4}$ in. broad above the middle, acute, quite entire, narrowed gradually from the middle to the base, coriaceous in texture, shining on the upper surface, with the veins and veinlets raised on both surfaces, the main ones close and erecto-patent, distinct from the midrib to the margin. Flowers in a peduncled terminal panicle, with two whorls of erecto-patent simply or doubly umbellate branches. Calyx campanulate, with a subentire collar-like limb. Petals not seen. Style with as many cusps at the tip as there are cells in the ovary.—Central Madagascar, in forests of the province of Imerina, *Baron* 1279!

CUSSONIA RACEMOSA, n. sp.

Arborea, glabra, ramulis crassis rugosis, foliis longe petiolatis digitatim 4–6-foliolatis, foliolis oblanceolatis sessilibus obtusis coriaceis integris, inflorescentiæ ramis bipinnatis, ramulis racemosis, pedicellis flore longioribus, bracteis minutis deltoideis, ovario biloculari, calycis limbo truncato, petalis oblongo-deltoideis.

A tree, glabrous in all its parts, with stout rugose woody branchlets. Leaves crowded; petiole reaching a length of 6–8 inches; leaflets quite sessile, 3–4 in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. broad, rigidly coriaceous, narrowed gradually to the base, all the veins except the midrib fine and quite hidden. Flowers in an ample panicle at the end of the branchlets, with numerous contiguous bipinnate branches; ultimate branchlets racemose. Flowers seen in the bud-stage only. Pedicels $\frac{1}{8}$ in. long, with a small deltoid bract at the base. Calyx campanulate, with a subentire limb. Bud subglobose.—Central Madagascar, *Baron* 2015!

CUSSONIA VANTSILANA, n. sp.

Arborea, glabra, foliis longe petiolatis digitatis rigide coriaceis nitidis, foliolis 3–6 sessilibus cuneatis apice truncato-cuspidatis, floribus copiose spicato-paniculatis, bracteolis parvis persistentibus deltoideis, calycis tubo cuneato limbo angusto subintegro, stylis brevibus connatis.

A tree, with stout ultimate branchlets, glabrous in all its parts. Petioles terete, sometimes a foot in length. Leaves digitately compound, very thick and rigid in texture, glossy on the upper surface, opaque beneath, with fine erecto-patent main veins; leaflets 3–6, sessile, cuneate, 3–6 in. long, broadest (2–3 in.) at the apex, emarginate, with or without a small cusp. Flowers in copious peduncled panicles, with erecto-patent spicate branches 1–3 in. long. Ovary sessile, deltoid, $\frac{1}{2}$ in. long, with a subentire narrow collar-like calyx-limb and at its base 2 or 3 minute persistent deltoid bracteoles. Unexpanded corolla subglobose, $\frac{1}{12}$ in. in diam.; petals oblong-lanceolate. Styles 2, erect, not more than one third as long as the ovary, connate nearly to the tip. Fruit oblong.—Forests of Central Madagascar, received in flower from Mr. Baron (No. 1016) and in leaf from Dr. Parker and long ago from Bojer. Native name *Vantsilana* or *Voantsilana.*

CUSSONIA FRAXINIFOLIA, n. sp.

Arborea, glabra, ramulis ultimis crassis, foliis imparipinnatis coriaceis longe petiolatis, foliolis 5–7 oblongis integris obtusis petiolatis, ramis paniculæ racemosis elongatis ramulis ultimis umbellatis, umbellis 6–8-floris, pedicellis quam flos 3–4plo longioribus, ovario orbiculari-oblongo sæpissime 2-loculari, limbo obscure dentato, stylo brevissimo apice cuspidato.

A tree, glabrous in all its parts, with very stout channelled rugose ultimate branchlets. Leaves a foot long, including the 3–4-in. petiole; leaflets in about 3 opposite pairs on short thick petiolules and a long-stalked end one, about 3 in. long, entire, obtuse, deltoid or rather rounded at the base, the veins except the midrib very fine and immersed. Flowers in an ample panicle at the end of the branches, with several erecto-patent branches with a large persistent cucullate obtuse bract at the base, those at the tip of the stem in a whorl, each branch bearing a large number of stalked umbels pinnately arranged. Pedicels $\frac{1}{4}$–$\frac{1}{3}$ in. long, square, not bracteated at the base. Ovary $\frac{1}{12}$ in. long, constricted at the neck, usually 2-celled, sometimes 3-celled, with an obscurely toothed spreading collar-like limb. Petals and stamens not seen. Style very short, 2–3-cuspidate at the tip.—Between Tankay and the east coast, *Baron* 1579!

CUSSONIA MYRIANTHA, n. sp.

Arborea, glabra, ramulis ultimis crassis, foliis longe petiolatis digitatim 7-foliolatis, foliolis longe petiolulatis late oblongis cuspidatis integris subcoriaceis nitidis, inflorescentiæ ramis omnium graduum umbellatis, umbellis ultimis 4–6-floris, pedicellis quam flos 2–3plo longioribus, ovario orbiculari biloculari, limbo subintegro, petalis deltoideis, staminibus inclusis, stylo subintegro.

A tree, glabrous in all its parts, with thick woody ultimate branchlets. Petiole half a foot long; petiolules 1$\frac{1}{2}$–2 in. long; leaflets 3–4 in. long, distinctly cuspidate, broadly rounded at the base, subcoriaceous, with fine close distinct erecto-patent main veins. Inflorescence terminal, nearly a foot broad, the umbellate branching five times repeated; main branches five, thick and 4-angled; final pedicels $\frac{1}{6}$ in. long, articulated at the base, with a minute deltoid bract. Calyx 1 line in diam., with a subentire spreading collar-like neck. Petals deltoid, greenish, under $\frac{1}{12}$ in.

long. Anthers oblong, with very short filaments. Style short, slender, entire.—Central Madagascar, *Baron* 2017!

DESCRIPTION OF THE PLATES.

PLATE XXII.

Fig. 1. *Sparmannia discolor*, n. sp. The plant in flower. 2. A sepal. 3. A stellate hair. 4. Stamens, their anterior and posterior faces. 5. Barren stamens. 6. The pistil. 7. Transverse section of the ovary. 8. A branch with ripe fruits.

PLATE XXIII.

Fig. 1. *Microsteira Curtisii*, gen. & sp. n. Portion of the plant, showing the staminate flowers. 2. A branch, with pistillate flowers. 3. A hair. 4. Male flower. 5. Calyx of the male flower. 6. Stamens, back and face. 7. Female flower with petals removed. 8. Petal of female flower. 9. The fruit; and 10, the same in side view: both of natural size. 11. The seed.

Contributions to the Flora of Madagascar.—Part II. Monopetalæ.

By J. G. BAKER, F.R.S., F.L.S.

[Read December 21, 1882.]

(PLATES XXIV.-XXVII.)

IN the present paper are characterized upwards of 150 Dicotyledons of the Gamopetalous series of natural orders, gathered in Madagascar by recent English collectors, especially by the Rev. R. Baron, F.L.S., of the London Missionary Society. The most interesting is *Schismatoclada*, a new genus of Rubiaceæ allied to *Cinchona*. The other new genera are :—*Tetraspidium*, of the group of semiparasitic Scrophulariaceæ such as *Pedicularis* and *Melampyrum* (which turn completely black in drying), remarkable for its four shield-shaped one-celled anthers; *Forsythiopsis*, an erect shrubby Acanthaceous genus with flowers like *Forsythia* and leaves not fully developed till after the flowers fade; and *Monachochlamys*, another genus of Acanthaceæ, allied to *Mendoncia* and *Thunbergia*, with numerous small flowers each contained in a persistent spathaceous bract like the hood of a Franciscan monk. Of representatives of well-known European genera, the present collection contains two species of *Anagallis* nearly allied to *A. tenella*, 2 Ajugas, a Salvia, 2 Micromerias, 3 species of *Stachys*, 5 Senecios, 3 Cynoglossums, and a Lysimachia. The genera represented most largely are *Danais*, *Vernonia*, *Helichrysum*, *Gærtnera*, *Clerodendron*, and *Hypoestes*. There is a single species of the beautiful Acanthaceous genus *Strobilanthes*, represented in India by above 100 species. There is a new *Vinca* allied to *V. rosea*. Of endemic genera known previously in the island, we have new species of *Aspilia*, *Epallage*, and *Oncostemon*. Of Cape types the principal are a *Lightfootia*, a *Halleria*, an *Alectra*, and two heaths of the genus *Philippia*.

SCHISMATOCLADA, genus novum Rubiacearum subordinis Cinchonacearum. (Tab. XXIV.)

Calycis tubus campanulatus; limbi dentes 5 lanceolatæ inæquales foliaceæ. Corolla hypocrateriformis, tubo cylindrico intus glabro, limbi segmentis oblongo-lanceolatis æstivatione valvatis. Stamina 5 ad corollæ tubi faucem inserta, filamentis filiformibus quam segmenta paulo brevioribus, antheris linearibus versatilibus. Discus conspicuus. Ovarium 2-loculare, ovulis numerosis placentis peltatim affixis; stylus filiformis, ramis 2 elongatis. Capsula coriacea ab apice septicide infra medium dehiscens, seminibus permultis

parvis planis testa laxa membranacea brunnea utrinque nuclei oblongi in caudas lanceolatas dentatas producta.—Arbor erecta glabra Madagascariensis, foliis oppositis obovato-oblongis, stipulis parvis deltoideis connatis interpetiolaribus, floribus parvis lilacinis glabris copiose corymboso-paniculatis sessilibus vel brevissime pedicellatis, bracteis parvis linearibus.

S. PSYCHOTRIOIDES, *Baker*. (Pl. XXIV. A. figs. 1–7.)

An erect tree with the habit of a *Psychotria*, glabrous in all its parts, the ultimate branchlets rather compressed, the nodes thickened. Stipules small, deltoid, connate, persistent. Leaves in opposite pairs, shortly petioled, obovate-oblong, acute, 3–4 in. long, 1–1¼ in. broad, deltoid at the base, bright green and glabrous on both surfaces, with numerous distinct arching parallel main veins. Flowers in small lax terminal panicles, with a few corymbose branches; pedicels none or short; bracts minute, linear, inconspicuous. Calyx-tube $\frac{1}{12}$ in. long; teeth twice as long, oblanceolate, foliaceous. Corolla-tube ¼ in. long, cylindrical, glabrous both inside and out; segments 5, oblong-lanceolate, $\frac{1}{6}$ in. long, slightly induplicate in æstivation, spreading horizontally when fully expanded. Stamens as long as the corolla-segments; filaments filiform; anthers linear. Capsule under ½ in. long, oblong, splitting from the apex nearly down to the base, rigid in texture, the top projecting distinctly beyond the persistent calyx-teeth; the placenta not reaching the top, and separating from the valves. Seeds $\frac{1}{6}$ in. long, numerous, flat, pale brown, glabrous, the testa produced into a lanceolate lacerated tail on both sides of the oblong nucleus.—Forests of the province of Imerina, *Baron* 1320 (fruit) and 1769 (flower).

The only other Old-world genus of Cinchoneæ with a septicidal capsule is the Himalayan *Hymenopogon*, from which this differs abundantly. Mr. Baron sends also what is most likely a second species, with obtuse leaves and considerably larger and more woody capsules; but of this there are no flowers; so I do not venture to characterize it.

DANAIS GERRARDI, n. sp.

Glabra, ramulis teretibus, foliis oppositis breviter petiolatis obovato-oblongis acutis, floribus in cymas sessiles axillares dispositis, pedicellis quam calyx 2–3plo longioribus, calycis dentibus linearibus tubo campanulato æquilongis, corollæ tubo cylindrico, dentibus quam tubus duplo brevioribus, staminibus leviter protrusis.

A climbing forest-shrub with slender glabrous terete branchlets. Leaves shortly petioled, moderately firm in texture, 2–3 in.

long, bright green and glabrous on both surfaces, narrowed gradually from the middle to the base. Flowers in copious sessile axillary cymes; pedicels $\frac{1}{8}$–$\frac{1}{6}$ in.; bracts minute, lanceolate. Flower-calyx $\frac{1}{12}$ in. long. Corolla-tube cylindrical, $\frac{1}{6}$ in. long; teeth oblong-lanceolate, $\frac{1}{12}$ in. long. Stamens rather longer than the corolla-segments. Fruit not seen.—Madagascar, *Gerrard* 162! Near Alamazaotra forest, *Baron* 1464! Between Tankay and the east coast, *Baron* 1536!

DANAIS VOLUBILIS, n. sp.

Volubilis, glabra, foliis oppositis vel ternatis petiolatis rigide coriaceis obovato-oblongis acutis vel obtusis cuspidatis, floribus in cymas densifloras axillares dispositis, pedicellis brevissimis, calycis dentibus lanceolatis tubum campanulatum 2–3plo superantibus, corollæ tubo elongato cylindrico, dentibus lanceolatis quam tubus 3–4plo brevioribus, fructibus globosis magnitudine mediocribus.

A scandent shrub, with slender terete woody stems, glabrous in all its parts. Leaves $1\frac{1}{2}$–2 in. long, sometimes above an inch broad, acute or obtuse with a cusp, very firm in texture, green and glabrous on both surfaces, with raised veinlets beneath. Flowers in copious dense axillary cymes with very short peduncles. Calyx $\frac{1}{8}$ in. long, with 5 lanceolate teeth much longer than the tube. Corolla-tube cylindrical, $\frac{1}{2}$ in. long; teeth 5, spreading, lanceolate, $\frac{1}{6}$ in. long. Stigma exserted, deeply bifid. Capsule depresso-globose, hard, brown, $\frac{1}{4}$–$\frac{1}{3}$ in. in diam.—Top of Ifody mountain, *Baron* 1372!

DANAIS HISPIDA, n. sp.

D. ramulis teretibus hispidis, foliis magnis oppositis petiolatis oblongis acutis subcoriaceis facie glabris dorso hispidulis, floribus in cymas densas axillares dispositis, pedicellis brevissimis, calycis tubo campanulato segmentis deltoideis, corollæ segmentis lanceolatis quam tubus subcylindricus 3–4plo brevioribus, fructu magnitudine mediocri nigro globoso.

A shrub or tree, with stoutish straight terete branchlets, densely clothed with stout brown articulated hairs. Leaves opposite, distinctly petioled, 3–4 in. long, 2 in. broad at the middle, narrowed gradually to the base and apex, subcoriaceous, green on both surfaces, glabrous above, furnished with a few bristly hairs beneath, with 8–10-jugate parallel arcuate ascending main veins. Flowers in dense axillary cymes with very short pedicels. Calyx glabrous, $\frac{1}{2}$ in. long, with a campanulate tube and 5 deltoid teeth. Corolla with a subcylindrical tube $\frac{1}{4}$ in. long, and small lanceolate segments. Stamens as long as the corolla-segments. Fruit hard, black, globose, $\frac{1}{6}$ in. in diam.—Central Madagascar, in forests of the province of Imerina, *Baron* 1304!

DANAIS PAUCIFLORA, n. sp.

D. ramulis teretibus glabris, foliis 2–3nis parvis petiolatis subcoriaceis obovato-oblongis acutis glabris, floribus in cymas paucifloras axillares dispositis, pedicellis quam calyx longioribus, calycis tubo campanulato dentibus minutis deltoideis, fructu maximo globoso glabro.

A much-branched shrub, glabrous in all its parts, with slender terete branchlets. Leaves distinctly petioled, sometimes opposite, sometimes ternate, 1–1$\frac{1}{4}$ in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. broad, acute, deltoid at the base, green and glabrous on both surfaces, the main veins distinct, anastomosing by an arch just within the margin. Flowers few together in copious axillary cymes; pedicels $\frac{1}{8}$–$\frac{1}{6}$ in. long. Flower-calyx, including the minute teeth, not more than $\frac{1}{2}$ line long. Corolla and stamens not seen. Fruit globose, $\frac{1}{2}$ in. in diam., black, hard, glabrous, splitting down the middle from the top nearly down to the base.—Central Madagascar, in forests of the province of Imerina, *Baron* 1298!

DANAIS TERNATA, n. sp.

D. ramulis teretibus breviter pilosis, foliis ternatis breviter petiolatis obovato-oblongis acutis, floribus in cymas paucifloras axillares dispositis, pedicellis quam calyx 3–4plo longioribus, calycis segmentis lanceolatis tubo campanulato æquilongis, fructu glabro globoso.

A shrub 5 or 6 feet high, with slender terete shortly pilose branchlets. Stipules minute, lanceolate-deltoid. Leaves all in whorls of three, shortly petioled, 2–3 in. long, acute, narrowed gradually from the middle to the base, moderately firm in texture, bright green and glabrous on both surfaces. Flowers in small sessile cymes in the axils of all the upper leaves; pedicels erect, $\frac{1}{8}$–$\frac{1}{6}$ in. long; bracts minute, lanceolate. Flower-calyx $\frac{1}{12}$ in. long. Corolla and stamens not seen. Capsule glabrous, depresso-globose, $\frac{1}{6}$ in. in diam.—Madagascar, *Gerrard*!

DANAIS LIGUSTRIFOLIA, n. sp.

D. ramulis glabris teretibus, foliis oppositis breviter petiolatis obovato-oblongis glabris acutis, floribus in paniculas terminales ramulis corymbosis dispositis, pedicellis fructu subæquilongis, calycis dentibus lanceolatis tubo campanulato æquilongis, corollæ tubo cylindrico quam calyx 2–3plo longiore dentibus oblongo-lanceolatis, fructu glabro globoso.

A forest shrub, glabrous in all its parts, with terete woody branchlets. Stipules minute, deltoid. Leaves shortly petioled, 2–3 in. long, bright green, glabrous, moderately firm in texture, acute, narrowed gradually from the middle to the base. Flowers in ample terminal panicles with corymbose branches; bracts minute, lanceolate. Flower-calyx $\frac{1}{12}$ in. long. Corolla $\frac{1}{6}$ in. long, pilose inside the tube, the teeth about a third as long as the cylindrical tube. Stamens as long as the corolla-segments. Capsule glabrous, globose, $\frac{1}{12}$ in. in diam., crowned, as in the other species, by the persistent diminished calyx-teeth.—Forests of Central Madagascar, in the province of Imerina, *Lyall* 123 *bis*! *Baron* 494! 1073!

DANAIS BREVIFLORA, n. sp.

D. ramulis glabris, foliis oppositis breviter petiolatis obovato-oblongis magnis acutis, floribus in paniculas terminales ramulis corymbosis dispositis, pedicellis brevissimis, calycis dentibus lanceolatis tubo campanulato duplo longioribus, corollæ tubo infundibulari quam calyx paulo longiore, dentibus oblongo-lanceolatis, staminibus haud exsertis.

A forest shrub, with glabrous terete branchlets. Leaves opposite, shortly petioled, glabrous, bright green, moderately firm in texture, 3–4 in. long, 18–21 lines broad, acute, narrowed gradually from the middle to the base. Flowers in an ample terminal panicle, with densely flowered erecto-patent branches; pedicels very short. Calyx $\frac{1}{12}$ in. long, glabrous. Corolla $\frac{1}{6}$ in. long, densely pilose at the throat, the spreading teeth half as long as the funnel-shaped tube. Stamens about as long as the corolla-segments. Fruit unknown.—Central Madagascar, in the province of Imerina, *Dr. Lyall* 225!

DANAIS MICROCARPA, n. sp.

Glabra, ramulis teretibus, foliis oppositis petiolatis obovato-oblongis acutis, floribus in paniculas amplas terminales ramulis corymbosis dispositis, pedicellis fructui æquilongis, calycis dentibus lanceolatis tubo campanulato æquilongis, fructu minuto glabro globoso.

A climbing shrub, glabrous in all its parts, with slender terete branchlets. Stipules minute, deltoid. Leaves distinctly petioled, moderately firm in texture, bright green and glabrous on both surfaces, 1–2 in. long, deltoid at the base. Flowers in ample oblong-deltoid terminal panicles with corymbose branches; pedicels $\frac{1}{2}$–1 line long; bracts minute, deltoid. Flower-calyx $\frac{1}{12}$ in. long; lanceolate teeth as long as the campanulate tube. Corolla and stamens not seen. Capsule glabrous, crustaceous, depresso-globose, not more than $\frac{1}{12}$ in. in diam., crowned by the minute persistent calyx-teeth.—Forests of the province of Betani-nema, *Bojer*! Forest of Andrangaloaka, *Dr. Parker*! *Baron* 1140! 1340!

DANAIS RHAMNIFOLIA, n. sp.

D. ramulis subteretibus ultimis puberulis, foliis oppositis petiolatis glabris magnis obovato-oblongis, floribus in paniculas copiosas terminales et axillares ramis corymbosis dispositis, pedicellis quam calyx longioribus, calycis dentibus lanceolatis tubo æquilongis, corollæ tubo quam calyx 4–6plo longiore, dentibus lanceolatis acutis quam tubus 2–3plo brevioribus, staminibus exsertis.

An erect shrub, with the ultimate branchlets minutely puberulous. Leaves opposite, distinctly petioled, bright green and glabrous on both surfaces, moderately firm in texture, 3–4 in. long, 1½–2 in. broad, deltoid at the base and apex, with distinct parallel arcuate ascending main veins. Flowers in copious ample axillary and terminal panicles with corymbose branches; pedicels slender, pubescent, 1–3 times as long as the calyx. Flower-calyx under $\frac{1}{12}$ in. long, the 5 lanceolate teeth equalling the campanulate tube. Corolla-tube cylindrical, $\frac{1}{6}$ in. long; teeth lanceolate, acute. Stamens longer than the corolla-segments. Fruit not seen.—Central Madagascar, *Baron* 919!

DANAIS VERTICILLATA, n. sp.

Glabra, ramulis acute tetragonis, foliis verticillatis 4natis sessilibus oblongis acuminatis, floribus in paniculam terminalem ramulis corymbosis dispositis, pedicellis brevibus, calycis dentibus lanceolatis tubo campanulato subæquilongis, fructu pro genere magno depresse globoso.

A forest shrub, 6 or 8 feet high, glabrous in all its parts, with acutely quadrangular branchlets. Leaves in whorls of four, sessile, 2–3 in. long, about an inch broad above the middle, bright green, moderately firm in texture, rounded at the base. Flowers in terminal panicles with corymbose branches; pedicels finally about as long as the fruit. Flower-calyx about a line long. Fruit depresso-globose, $\frac{1}{6}$ in. in diam.—Forest of Andrangaloaka, *Dr. Parker*! *Baron* 1307!

DANAIS PUBESCENS, n. sp.

D. ramulis dense pubescentibus, foliis oppositis petiolatis parvis ovatis acutis subcoriaceis, floribus in paniculas terminales ramulis paucifloris corymbosis dispositis, pedicellis brevissimis vel nullis, calycis dentibus lanceolatis tubo campanulato æquilongis, fructu nigro globoso calvato.

A forest shrub 10 or 12 feet high, with slender terete densely pilose branchlets. Leaves opposite, with a pilose petiole $\frac{1}{4}$–$\frac{1}{3}$ in. long, and an ovate rigid dark green blade 1–1$\frac{1}{2}$ in. long, rounded at the base, nearly glabrous above, pilose especially on the ribs beneath. Flowers in a terminal panicle, with distant few-flowered erecto-patent corymbose densely pilose branches. Flower-calyx about $\frac{1}{12}$ in. long, densely pilose. Corolla and stamens not seen. Fruit black, hard, globose, $\frac{1}{6}$–$\frac{1}{5}$ in. in diam.—Forest of Andrangaloaka, *Dr. Parker*! Top of Ifody mountain, *Baron* 1375!

PENTAS MUSSÆNDOIDES, n. sp.

Fruticosa, fusco-pubescens, stipulis brevibus fimbriatis, foliis petiolatis oblongo-lanceolatis membranaceis a medio ad apicem et basin angustatis, floribus in cymas terminales corymbosas vel racemosas aggregatis, pedicellis brevissimis vel sub nullis, fructu infundibulari coriaceo 10-costato, calycis dentibus 4 parvis lanceolatis, quinto magno foliaceo oblanceolato petiolato, corollæ pilosæ tubo cylindrico segmentis parvis lanceolatis.

An erect shrub or small tree, 10 or 15 feet high, with slender terete branchlets, clothed with short deciduous brown pubescence. Stipules short, fimbriated, with pubescent setaceous segments. Leaves distinctly petioled, membranous, 4–5 in. long, 1–1$\frac{1}{2}$ in. broad at the middle, acute or acuminate, narrowed to the base, finely brown-pubescent, with numerous parallel arcuate ascending main veins. Flowers in an ample terminal panicle, with short or elongated cymose branches. Corolla with a pilose cylindrical tube an inch long, and 5 or rarely 6 small lanceolate segments. Stamens sessile near the top of the corolla-tube. Capsule infundibuliform, coriaceous, $\frac{3}{8}$ in. long, narrowed gradually to the base, with 10 distinct subequal ribs. Calyx-teeth 4 small lanceolate unequal, the fifth membranous, oblanceolate, obtuse, distinctly petioled, $\frac{3}{4}$–1 in. long, greenish-yellow with green veins.—Central Madagascar, gathered long ago by Lyall (195), and now rediscovered by Baron (1059 and 1921) and Parker in the forest of Andrangaloaka.

UROPHYLLUM LYALLII, n. sp.

Arborea, ramulis obscure hispidis, stipulis lanceolatis, foliis oppositis breviter petiolatis oblongo-lanceolatis acuminatis utrinque viridibus glabris, floribus in cymas paucifloras axillares dispositis, pedicellis brevibus, calycis dentibus lanceolatis tubo campanulato æquilongis, corollæ tubo cylindrico intus piloso, dentibus deltoideis, staminibus inclusis, fructu globoso nigro 4-loculari magnitudine pisi.

A much-branched small erect tree, 12–20 feet high, with slender terete obscurely hispid branchlets. Stipules lanceolate, entire, persistent. Leaves shortly petioled, 3–4 in. long, an inch broad, acuminate, moderately firm in texture, bright green and glabrous on both surfaces, with much-raised 6–8-jugate arcuate-ascending main veins. Flowers few together in copious small nearly sessile axillary cymes. Flower-calyx $\frac{1}{2}$ in. long; teeth 5, lanceolate. Corolla-tube $\frac{1}{6}$ in. long, hairy all down inside; segments half as long as the tube. Stamens 5, inserted above the middle of the corolla-tube; filaments filiform, as long as the oblong anthers. Style as long as the corolla-tube, simple. Fruit glabrous, globose, with numerous scarlet seeds in each of the four cells.—Forests of the province of Imerina, gathered long ago by Bojer and Lyall (343), and now rediscovered by Dr. Parker and Mr. Baron (1039, 1049, 1250, 1527, 1649).

MUSSÆNDA TRICHOPHLEBIA, n. sp.

M. ramulis apice pilosis, stipulis lanceolatis vel deltoideis, foliis oppositis petiolatis obovato-oblongis acutis facie obscure pilosis dorso ad venas dense pilosis, floribus dense corymboso-paniculatis, pedicellis brevibus, bracteis lanceolatis, calycis pilosi dentibus lanceolatis tubo clavato æquilongis, corollæ tubo cylindrico dense piloso bipollicari, segmentis lanceolatis quam tubus quadruplo brevioribus, fructu oblongo-clavato calvato.

An erect tree, with pilose branchlets. Stipules persistent, pilose, lanceolate or deltoid. Leaves opposite, shortly petioled, obovate-oblong, acute, 2–3 in. long, narrowed to the base, green and obscurely pilose above, dull green and densely pilose especially on the arcuate ascending 8–9-jugate parallel main veins beneath. Flowers in dense terminal corymbs, sessile or shortly pedicellate; bracts lanceolate, persistent. Flower-calyx under $\frac{1}{2}$ in. long, densely silky; teeth lanceolate, as long as the tube. Corolla whitish, densely silky on the outside, with a cylindrical tube 2 in. long and 5 lanceolate segments. Stamens inserted above the middle of the corolla-tube, included; anthers large, linear. Style densely pilose, with 2 lanceolate stigmatic lobes $\frac{1}{12}$ in. long. Fruit clavate-oblong, glabrescent, under an inch long, crowned by the persistent calyx-teeth.—Forests of Central Madagascar, *Baron* 493! 1764! A near ally of *M. Landia* and *M. hymenopogonoides*.

MUSSÆNDA VESTITA, n. sp.

M. ramulis dense pilosis, stipulis parvis pilosis, foliis petiolatis oblongis acutis subcoriaceis facie viridibus hispidis dorso dense persistenter albido-tomentosis, floribus dense corymboso-paniculatis, pedicellis brevibus, calycis dense pilosi dentibus lanceolatis tubo æquilongis, corollæ dense pilosæ segmentis oblongo-lanceolatis tubo cylindrico 3–4plo brevioribus, fructu oblongo-clavato piloso.

An erect tree, with slender terete woody branchlets, densely clothed with short spreading firm dark-brown hairs. Stipules $\frac{1}{8}$ in. long. Leaves opposite, shortly petioled, 2–4 in. long, $1\frac{1}{2}$–2 in. broad, entire, deltoid at the base, thick and firm in texture, green and scabrous with short bristly hairs above, densely matted with thick whitish tomentum beneath, with 10–12-jugate ascending brown main veins. Flowers in a dense shortly peduncled terminal corymb. Calyx $\frac{1}{3}$ in. long; segments lanceolate, acute. Corolla densely clothed with drab hairs on the outside; tube subcylindrical, an inch long; segments oblong-lanceolate, cuspidate. Capsule subterete, densely pubescent, $\frac{5}{8}$–$\frac{3}{4}$ in. long, full of very numerous minute small black seeds.—Woods of Betsileo-land, *Kitching*! *Baron* 55! This may possibly be the imperfectly described *M. discolor*, Thouars, of which the native country is unknown.

Alberta laurifolia, Baker in Journ. Linn. Soc. xviii. 271 (*Baron* 2019), I find had been already described by Dr. Baillon (Adansonia, xii. 247) under the name of *Alberta minor*.

PLECTRONIA DENSIFLORA, n. sp.

Arborea, glabra, stipulis magnis coriaceis, foliis petiolatis magnis oblongis coriaceis glabris venis primariis validis parallelis 6–8-jugis, floribus in cymas densas sessiles axillares umbellatas dispositis, pedicellis quam flos longioribus, calycis minuti tubo cuneato dentibus deltoideis, corollæ segmentis oblongo-deltoideis tubo æquilongis, antheris ad corollæ faucem pilosam sessilibus.

An erect tree, glabrous in all its parts, with terete branchlets. Stipules lanceolate, coriaceous, above $\frac{1}{2}$ in. long. Leaves distinctly petioled, 6–8 in. long, 2–3 in. broad, subobtuse, rounded at the base, bright green and rather shining above, paler beneath, with 6–8 parallel pairs of strongly marked arcuate ascending main veins. Flowers in dense sessile axillary umbels; pedicels about $\frac{1}{3}$ in. long. Flower-calyx $\frac{1}{2}$ lin. in diam. Corolla $\frac{1}{8}$ in. long, the oblong-lanceolate teeth equalling the tube. Anthers minute, oblong, inserted at the densely hairy throat of the corolla-tube. Fruit not seen.—Madagascar, *Gerrard* 61!

PLECTRONIA UMBELLATA, n. sp.—Pyrostria umbellata, *Bojer, Hort. Maur.* 170 (nomen solum).

Arborea, glabra, stipulis magnis oblongo-deltoideis, foliis magnis petiolatis oblongis, floribus in cymas densas axillares umbellatas pedunculatas conspicue bracteatas dispositis, pedicellis elongatis, calycis tubo campanulato, limbo minuto, corollæ tubo campanulato, segmentis 4 oblongo-lanceolatis, staminibus minutis ad corollæ faucem pilosam sessilibus, fructu globoso compresso duro emarginato.

An erect tree or large shrub, glabrous in all its parts. Stipules oblong or deltoid, coriaceous, persistent, $\frac{1}{4}$–$\frac{1}{3}$ in. long. Leaves distinctly petioled, oblong, subcoriaceous, 4–8 in. long, $2\frac{1}{2}$–4 in. broad, with 6–8 pairs of conspicuously raised ascending parallel main veins. Flowers in dense umbellate peduncled axillary cymes, with a pair of large deltoid bracts at the base; pedicels $\frac{1}{4}$ in. long. Calyx-tube $\frac{1}{12}$ in. long; limb very short, collar-like, subtruncate. Corolla $\frac{1}{6}$ in. long, with a campanulate tube and 4 oblong-lanceolate segments. Stamens 4, the minute anthers nearly sessile at the densely pilose throat of the corolla. Stigma with 2 orbicular lobes. Fruit hard, black, compressed, glabrous, two-lobed, $\frac{1}{3}$ in. in diam., containing two bony pyrenes.—Central Madagascar, *Dr. Meller*! *Baron* 1626! Introduced long ago by Bojer into the gardens of Mauritius.

VANGUERIA EMIRNENSIS, n. sp.

Arborea, inermis, ramulis pilosis, stipulis deltoideis laceratis, foliis petiolatis oblongis facie obscure dorso præsertim ad venas dense albido-pilosis, floribus in cymas densas terminales dispositis, pedicellis brevissimis, calycis tubo campanulato dentibus 5 parvis inæqualibus deltoideis vel lanceolatis, corollæ pilosæ tubo cylindrico segmentis lanceolatis, staminibus ad corollæ faucem dense pilosam insertam, filamentis brevibus.

A much-branched erect tree, with pilose terete branchlets. Stipules deltoid, persistent, deeply fimbriated. Leaves distinctly petioled, subacute or subobtuse, cuneate at the base, $1\frac{1}{2}$–3 in. long, deltoid at the base, membranous, nearly glabrescent above, densely pilose on the 7–8-jugate ascending main veins beneath. Flowers in copious dense nearly sessile terminal cymes; bracts minute; pedicels 0 or very short. Calyx $\frac{1}{12}$ in. long, with a campanulate tube and 5 (rarely 6) minute lanceolate or deltoid teeth. Corolla $\frac{1}{3}$ in. long, densely pilose on the outside, with 5 (rarely 6) small lanceolate teeth. Stamens inserted at the densely pilose throat of the corolla-tube; filaments as long as the oblong anthers. Fruit not seen.—Forests of Central Madagascar, *Baron* 1914! 2053!

HYMENOCNEMIS MADAGASCARIENSIS, *Hook. fil.*

This endemic genus, which was characterized for the first time by Sir J. D. Hooker in 'Genera Plantarum' from a single specimen in an early stage, has been refound in many places by Dr. Parker and Mr. Baron: cf. the numbers of the latter collection 366, 400, 1267, 1328, and 1350. It is a forest shrub 8 or 10 feet high with a small dark-blue berry; and as the fruit proves to be superior, it will have to be transferred from Rubiaceæ to the neighbourhood of *Gaertnera* in Loganiaceæ.

PSYCHOTRIA TERNIFOLIA, n. sp.

Arborea, glabra, foliis ternatis breviter petiolatis obovato-oblongis acutis, stipulis deltoideis 1-cuspidatis, floribus in paniculas densas corymbosas dispositis bracteis minutis pedicellis brevissimis, calycis tubo campanulato dentibus minutis, corollæ glabræ tubo cylindrico segmentis quam tubus paulo brevioribus, antheris magnis linearibus ad corollæ faucem pilosam sessilibus, fructu lævi ovoideo.

A shrub or tree, glabrous in all its parts, with slender terete smooth woody branchlets. Leaves three in a whorl, shortly petioled, 2½–3 in. long, 1–1½ in. broad, very acute, narrowed gradually from the middle to the base, moderately firm in texture, green on both surfaces, with distinct arcuate ascending main veins. Flowers in dense terminal panicles with corymbose branches; bracts minute; pedicels very short. Calyx with a campanulate tube and 5 minute teeth. Corolla ¼ in. long, with 5 oblong-lanceolate segments rather shorter than the cylindrical tube. Anthers 5, about as long as the segments, sessile at the densely hairy throat of the corolla-tube. Fruit ovoid, ¼ in. long, 2-celled, the seeds not grooved.—Central Madagascar, *Baron* 1955! We have above a dozen species of this genus from Central Madagascar, but only fully complete specimens of these two.

PSYCHOTRIA (§ GRUMILEA) TRICHANTHA, n. sp.

Arborea, ramulis dense breviter brunneo-pilosis, stipulis deltoideis, foliis oppositis breviter petiolatis obovatis obtusis minute cuspidatis facie glabris dorso pubescentibus, floribus corymboso-fasciculatis breviter pedicellatis, bracteis minutis caducis, calycis tubo globoso segmentis minutis deltoideis, corollæ brunneo-pilosæ parvæ tubo cylindrico segmentis tubo æquilongis, staminibus ad corollæ faucem insertis, fructu parvo orbiculari multisulcato.

A tree or shrub, with slender terete branchlets densely clothed with short dark-brown hairs. Stipules small, deltoid, persistent. Leaves distinctly petioled, 3–4 in. long, $1\frac{1}{2}$–2 in. broad, broadly obtuse with a minute cusp, narrowed gradually from the middle to the base, moderately firm in texture, dark green and glabrous above, finely brown-pubescent beneath especially on the distinct arcuate ascending parallel 8–10-jugate main veins. Flowers in small lax terminal panicles with corymbose branches, clothed with dense short brown hairs. Calyx $\frac{1}{2}$ in. long. Corolla $\frac{1}{4}$ in. long, densely clothed outside with brown hairs; tube as long as the segments, hairy also inside. Stamens shorter than the segments, with short filaments and linear-oblong anthers. Fruit subglobose, $\frac{1}{12}$ in. long, pilose, with 10 distinct vertical ribs, the two bony pyrenes deeply grooved both on back and face.—Central Madagascar, *Baron*! (not numbered).

HYDROPHYLAX MADAGASCARIENSIS, *Willd.*; *DC. Prod.* iv. 576.

***H.* foliis ad apices ramorum confertis ovato-lanceolatis, floribus solitariis terminalibus sessilibus, calycis tubo infundibulari dentibus deltoideis, corollæ tubo subcylindrico, segmentis lanceolatis quam tubus brevioribus.**

A glabrous perennial, with a wide-trailing quadrangular stem, sending out tufts of root-fibres downwards and short erect simple or branched stems upwards from the nodes. Leaves spaced on the lower part, crowded in opposite pairs towards the tip of the branches, spreading, ovate-lanceolate, acute, $\frac{1}{4}$–$\frac{1}{3}$ in. long, connate with the stipules into a sheathing cup at the base. Flowers solitary, sessile in the axil of the top pair of leaves. Calyx minute, with an infundibuliform tube and 4 deltoid teeth. Corolla lilac, with a funnel-shaped tube $\frac{1}{6}$ in. long and 4 lanceolate segments. Stamens 4, nearly sessile at the pilose throat of the corolla-tube anthers linear. Style slender, much exserted from the tube, shortly bifid. Fruit not seen.—East coast, close to the sea on the sandy shore, *Baron* 1395! Gathered also by Bojer in sandy ground in the interior in the province of Imerina.

OTIOPHORA PAUCIFLORA, n. sp.

Herbacea, perennis, caulibus pilosis, stipulis fimbriatis, foliis oppositis ovatis acutis membranaceis glabris, floribus sessilibus terminalibus, calycis tubo piloso, dentibus inæqualibus 1–2 magnis foliaceis, corollæ tubo elongato filiformi, segmentis lanceolatis quam tubus triplo brevioribus, staminibus corollæ segmentis æquilongis, stylo profunde bifido, fructu oblongo.

A much-branched perennial herb, with slender pilose stems sometimes 1–2 ft. long. Leaves shortly petioled, ovate, acute, $\frac{1}{4}$–$\frac{1}{2}$ in. long, cuneate at the base, green and glabrous on both surfaces. Stipules each with about three setaceous cusps. Flowers 1–2, sessile in the axil of the whorl of leaves that terminates the branches. Calyx $\frac{1}{6}$ in. long in the flowering-stage, with a small oblong tube, 3–4 minute teeth and 1–2 large leafy ones. Corolla-tube very slender, $\frac{1}{4}$ in. long. Stamens 5, inserted at the throat of the corolla-tube; filaments filiform; anthers linear-oblong. Fruit oblong, densely pilose, crowned by the persistent unequal calyx-segments.—Central Madagascar, in dry soil in the province of Imerina, *Lyall* 305! *Parker*! *Baron* 444! 1118! 1009! a dwarf densely-tufted variety with leaves never above $\frac{1}{4}$ in. long. Well marked from the only other species, *O. scabra*, Zucc., by the inflorescence and the shape of the leaves.

ANTHOSPERMUM POLYACANTHUM, n. sp.

Herbaceum, perenne, glabrum, dense cæspitosum, foliis sessilibus verticillatis lanceolatis aculeis retrorsis marginatis, floribus minutis sessilibus terminalibus, masculo ovario rudimentario bilobo limbo calycino nullo, corollæ infundibularis segmentis oblongis quam tubus longioribus, staminibus segmentis æquilongis, filamentis elongatis, antheris minutis oblongis, stylo profunde bifido.

A perennial herb with the habit of a *Galium*, with densely tufted erect sharply 4-angled stems, glabrous in all its parts. Leaves 4–5 in a whorl, sessile, lanceolate, spreading, $\frac{1}{4}$ in. long, firm in texture, turning blackish when dried, margined by 5–6 strong hooked stramineous prickles on each side. Flowers sessile in the axil of the upper whorl of the leaves. Ovary in the staminate flower minute, 2-lobed, emarginate, without any distinct calyx-limb. Corolla $\frac{1}{8}$ in. long, with a short funnel-shaped tube and 4 oblong ascending segments twice as long as the tube and hispid at the tip outside. Stamens as long as the corolla-segments; filament long, slender; anthers minute, oblong.—Central Madagascar, *Baron* 1849!

ANTHOSPERMUM THYMOIDES, n. sp.

Herbaceum, perenne, dense cæspitosum, caulibus gracillimis puberulis, stipulis deltoideis, foliis sessilibus verticillatis oblanceolatis, floribus monoicis ad axillas foliorum sessilibus, ovario bilobo, limbo calycino subnullo, staminiferis corollæ tubo infundibulari, segmentis lanceolatis tubo æquilongis, staminibus segmentis æquilongis.

A densely tufted perennial herb, with very slender ascending much-branched puberulent stems a foot long. Stipules minute, deltoid. Leaves 5–6 in a whorl, often with suppressed branches in their axils, sessile, oblanceolate, acute, 1-nerved, $\frac{1}{6}$ in. long, without prickles on the margin. Flowers several, sessile in the axils of the upper whorls. Female flower with a globose glabrous 2-lobed ovary. Male flower with a corolla $\frac{1}{12}$ in. long, with four lanceolate segments equalling in length the funnel-shaped tube and 4 stamens as long as the segments with filiform filaments and cream-coloured versatile linear-oblong anthers.—Central Madagascar, *Baron* 2005!

VERNONIA SPARSIFLORA, n. sp.

Fruticosa, ramulis dense brunneo-pubescentibus, foliis petiolatis late oblongis cuspidatis obscure denticulatis subcoriaceis pubescentibus, capitulis 1–2-floris in corymbos terminales densissime aggregatis pedicellis nullis, involucri oblongi bracteis circiter 15 brunneis rigidis acutis caducis parce pilosis, pappi albi setis rigidulis conformibus.

A shrub, with terete woody branchlets, densely coated with short brown pubescence. Leaves distinctly petioled, 4–5 in. long, 2½–3 in. broad at the middle, distinctly cuspidate, rounded or deltoid at the base, very minutely and remotely denticulate, scabrous with minute hairs on the upper surface, clothed all over with short brown pubescence beneath. Capitula very numerous, aggregated in peduncled terminal corymbose panicles with capitate branches. Involucre oblong, $\frac{1}{8}$ in. long, composed of about 15 rigid acute bracts, the inner ones lanceolate, the outer minute and ovate, hairy mainly on the margin. Achene glabrous, only seen immature. Pappus $\frac{1}{6}$ in. long, composed of numerous uniform white bristles.—Central Madagascar, *Baron*!

VERNONIA DELAPSA, n. sp.

Fruticosa, ramulis pubescentibus, foliis petiolatis oblongis acutis denticulatis subcoriaceis glabris, capitulis trifloris laxe corymbosis breviter pedicellatis, involucri campanulati bracteis triseriatis adpressis caducis glabris brunneis rigidulis subobtusis, pappi setis albis hispidis ciliatis exterioribus parvis linearibus.

A shrub, with slender terete woody shortly pubescent branchlets. Leaves shortly petioled, 1½–2 in. long, acute, deltoid or rather rounded at the base, subcoriaceous, minutely denticulate, green and glabrous on both surfaces. Capitula in an ample terminal panicle, with corymbose pilose branches, crowded, shortly-stalked. Involucre campanulate, $\frac{1}{6}$ in. long; bracts 3–4-seriate, glabrous, adpressed; inner lanceolate, subobtuse, caducous; many outer very small, ovate. Pappus of very numerous white bristles $\frac{1}{6}$ in. long, with a row of minute linear ones on the outside.—Central Madagascar, *Baron*!

VERNONIA QUADRIFLORA, n. sp.

Fruticosa, glaberrima, foliis obscure petiolatis obovato-oblongis acutis serrulatis nitidis rigidulis utrinque viridibus glabris, capitulis parvis 3–4-floris densissime corymboso-paniculatis pedicellis brevissimis, involucri campanulati bracteis 2–3-seriatis imbricatis rigidulis obtusis glabris, floribus rubellis, achenio glabro tereti, pappi setis permultis albis flexuosis ciliatis.

A much-branched shrub, glabrous in all its parts, with slender woody branchlets, closely leafy up to the top. Leaves alternate, scarcely petioled, $1\frac{1}{2}$–2 in. long, $\frac{3}{4}$–1 in. broad, inciso-crenate, narrowed gradually from the middle to the base, bright green and glabrous on both surfaces, thin but firm in texture. Capitula very numerous, arranged in dense level-topped terminal panicles. Involucre campanulate, $\frac{1}{6}$ in. long and broad, the bracts rigid in texture, regularly imbricated, caducous, the inner linear-oblong, the outer small, oblong. Corolla pale red, $\frac{1}{6}$ in. long, with large lanceolate segments. Achene terete, distinctly costate, $\frac{1}{12}$ in. long. Pappus $\frac{1}{6}$ in. long, of very numerous white persistent flexuose ciliated bristles.—Central Madagascar, *Baron* 1679!

VERNONIA BARONI, n. sp.

Fruticosa, ramulis breviter pubescentibus, foliis petiolatis oblongis subacutis serratis subcoriaceis facie scabris dorso pubescentibus, capitulis 4-floris sessilibus dense corymbosis, involucri oblongi bracteis rigidis multiseriatis acutis pubescentibus, pappi setis multis ciliatis albis, exterioribus parvis subulatis.

A shrub, with slender woody branchlets, clothed with short pubescence. Leaves distinctly petioled, oblong, 2–3 in. long, 1–$1\frac{1}{2}$ in. broad, distinctly serrated, deltoid and entire at the base, subcoriaceous, green and scabrous on the upper surface, matted all over with thin pubescence beneath, the erecto-patent parallel main veins connected by distinct arches near the margin. Capitula very numerous, sessile, in densely crowded peduncled corymbs. Involucre oblong, $\frac{1}{6}$ in. long, the very numerous rigid bracts regularly imbricated in many rows, dull brown, slightly pilose, the inner soon caducous. Achene glabrous, not seen fully mature. Pappus $\frac{1}{6}$ in. long, of very numerous white ciliated bristles, the outer like the others but much shorter.—Central Madagascar, *Baron*!

VERNONIA DISSOLUTA, n. sp.

Arborea, ramulis dense breviter brunneo-pilosis, foliis petiolatis ovatis denticulatis acutis subcoriaceis facie viridibus scabris dorso venulosis brunneo-pilosis, capitulis parvis 4–5-floris densissime corymboso-paniculatis pedicellis brevissimis, involucri campanulati bracteis 3–4-seriatis rigidulis acutis facile caducis, floribus albidis, achenio glabro, pappi setis albis flexuosis ciliatis.

A tree, with slender terete woody branchlets densely clothed with short brown pubescence. Petiole under an inch long; blade 3–4 in. long, $1\frac{1}{2}$–2 in. broad, acute or subobtuse, distantly denticulate, rounded at the base, dark green and rough with small raised points on the upper surface, shortly pilose with the veins and veinlets raised beneath. Heads very numerous, in dense terminal corymbose panicles. Involucre $\frac{1}{6}$ in. long and broad, soon falling to pieces; bracts acute, firm in texture, brownish, pilose, the outer gradually smaller. Achene glabrous, $\frac{1}{8}$ in. long. Pappus $\frac{1}{6}$ in. long, of numerous pure white flexuose bristles.—Central Madagascar, *Baron* 1693!

VERNONIA LYALLII, n. sp.

Fruticosa, ramosissima, ramulis albo-incanis, foliis brevissime petiolatis obovato-oblongis integris obtusis coriaceis facie viridibus glabris dorso persistenter albo-incanis, capitulis parvis 6–8-floris dense corymboso-paniculatis brevissime pedicellatis, involucri campanulati bracteis rigidulis obtusis parce pilosis 3–4-seriatis exterioribus sensim brevioribus, achenio piloso, pappi setis albidis rigidulis ciliatis.

A much-branched shrub, with slender conspicuously sulcate branchlets, closely leafy up to the top. Leaves shortly petioled, 2–3 in. long, $\frac{3}{4}$–1 in. broad, narrowed gradually from the middle to the base, bright green and glabrous on the upper surface, matted beneath with thin persistent whitish tomentum. Capitula very numerous, in dense level-topped terminal panicles with very short pedicels. Involucre $\frac{1}{6}$ in. long and broad, the bracts rigid in texture, greenish-brown with bright red tips, the inner ones linear-oblong, the outer oblong. Corolla red, $\frac{1}{6}$ in. long. Achene seen only immature. Pappus $\frac{1}{6}$ in. long, of very numerous whitish flexuose ciliated bristles. Central Madagascar, in forests of the province of Imerina, *Baron* 1311! *Lyall* 74!

VERNONIA APOCYNIFOLIA, n. sp.

Fruticosa, volubilis, ramulis gracilibus albo-incanis, foliis petiolatis oblongis subacutis parce dentatis subcoriaceis utrinque viridibus glabris, capitulis 15-floris parvis copiose spicato-paniculatis, involucri campanulati bracteis biseriatis lineari-oblongis subacutis rigidulis æquilongis tenuiter albo-incanis, floribus pallidis, achenio glabro, pappi setis albidis flexuosis ciliatis.

A woody climber with the habit of a scandent *Mikania* or *Microglossa*, with slender stems, thinly clothed with white cottony tomentum. Petiole under an inch long; blade 3–4 in. long, 1½–2 in. broad at the middle, rounded or subdeltoid at the base, distantly toothed or subentire, subcoriaceous in texture, green and glabrous on both surfaces. Heads in lax terminal and axillary oblong-deltoid panicles, with numerous ascending spicato-corymbose branches, specially crowded towards their tip; pedicels none. Involucre $\frac{1}{8}$ in. long and broad; bracts few, blackish, subacute, thinly coated with white cottony tomentum. Achene only seen in a young state. Corolla $\frac{1}{8}$ in. long, with very short teeth. Pappus as long as the corolla, of very numerous white flexuose bristles.—Central Madagascar, *Baron* 1698!

VERNONIA (§ TEPHRODES) ARGUTA, n. sp.

Herbacea, perennis, caule gracili simplici hispidulo, foliis petiolatis lanceolatis acuminatis argute serratis utrinque viridibus obscure hispidulis, capitulis parvis 15–20-floris laxe copiose corymboso-paniculatis, pedicellis elongatis, involucri campanulati bracteis biseriatis adpressis glabris rigidulis lanceolatis acutis, floribus rubellis, achenio obscure costato hispidulo, pappi setis albis exterioribus minutis lanceolatis interioribus elongatis filiformibus flexuosis.

An erect perennial herb, 2–3 feet high, with slender terete obscurely scabrous stems, unbranched below the panicle. Leaves distant, patent, distinctly petioled, moderately firm in texture, green and shortly distantly hispid on both surfaces, the lower lanceolate, 2–3 in. long, under an inch broad, cuneate at the base, the upper deltoid. Capitula numerous, arranged in a very lax terminal panicle, with corymbose branches and long pedicels. Involucre $\frac{1}{6}$ in. long and broad; bracts greenish-brown, subrigid, acuminate, adpressed, distinctly biseriate. Corolla bright red-purple. Achene terete, ½ line long. Pappus pure white, $\frac{1}{6}$ in. long; outer row of setæ minute; inner uniform, flexuose, persistent, ciliated. Between Tankay and the east coast, *Baron* 1553! A near ally of the well-known *V. cinerea*, Lessing.

VERNONIA APHANANTHA, n. sp.

Fruticosa, ramulis breviter pilosis, foliis sessilibus oblanceolatis acutis denticulatis utrinque viridibus breviter pilosis, capitulis parvis multifloris dense corymbosis, involucri campanulati bracteis rigidulis 3–4-seriatis adpressis viridibus apice rubellis pilosis exterioribus sensim brevioribus, achenio glabro, pappi setis albidis flexuosis ciliatis.

A shrub, with slender woody branchlets, densely coated with short brown hairs. Leaves crowded, sessile, 2–3 in. long, about $\frac{1}{2}$ in. broad, subentire or sparsely denticulate, moderately firm in texture, green and rough with dense short hairs on both surfaces, the side veins connected by arching veinlets within the margin. Heads in small dense terminal corymbs with very short pedicels, containing each 20–30 flowers. Involucre $\frac{1}{6}$ in. long and broad, the bracts firm in texture, densely pilose, green on the back, bright red at the tip, the outer gradually shorter. Achene only seen immature. Pappus $\frac{1}{8}$ in. long, of numerous whitish flexuose ciliated bristles.—Between Tankay and the east coast, *Baron* 1552!

VERNONIA LEUCOPHYLLA, n. sp.

Fruticosa, ramulis albo-incanis, foliis petiolatis oblanceolato-oblongis obtusis subintegris rigide subcoriaceis facie viridibus subglabris dorso persistenter albo-incanis, capitulis parvis multifloris dense copiose corymboso-paniculatis pedicellis brevibus albo-incanis, involucri campanulati bracteis 3–4-seriatis obtusis brunneis apice glabris dorso albo-incanis exterioribus sensim brevioribus, floribus pallidis, achenio glabro, pappi setis albidis flexuosis ciliatis.

A shrub, with woody branchlets coated with white tomentum. Leaves 2–3 in. long, under an inch broad, subcoriaceous, obtuse, dark green and nearly glabrous above when mature, coated with thin persistent white tomentum beneath, narrowed gradually from the middle to the short petiole. Heads very numerous, arranged in level-topped terminal panicles, with short pedicels coated with white tomentum. Involucre under $\frac{1}{4}$ in. in diam., $\frac{1}{6}$ in. long; inner bracts oblong, obtuse, brown and subscariose in the upper half; outer ones gradually shorter, matted with white tomentum on back. Flowers about 20 in a head. Achene under a line long, finally glabrous. Corolla $\frac{1}{6}$ in. long, with very short teeth. Pappus as long as the corolla, of numerous whitish persistent ciliated bristles.—Central Madagascar, *Baron* 2104!

VERNONIA PIPTOCARPHOIDES, n. sp.

Arborea, ramulis angulatis dense albido-incanis, foliis petiolatis oblongis integris subcoriaceis obtusis facie viridibus glabris dorso dense persistenter albido-incanis, capitulis multifloris in cymas densas axillares aggregatis, pedicellis nullis vel brevissimis, involucri infundibularis bracteis multiseriatis regulariter imbricatis rigidis brunneis lanceolatis acutis, achenio scabro, pappi setis permultis albidis conformibus flexuosis fragilibus.

A much-branched shrub, with angled branchlets, densely coated with lepidote whitish persistent tomentum. Leaves crowded up to the top of the branchlets; petiole about ½ in. long; blade 2–3 in. long, 1½–2 in. broad, rounded at both ends, quite entire, firm in texture, green and glabrous above, densely coated beneath with tomentum like that of the branchlets, the ascending parallel raised main veins distinct nearly to the edge. Capitula several, in congested axillary cymes. Involucre ¼ in. long, the brown rigid glabrous acute multiseriate bracts regularly imbricated. Corolla brownish-white, cylindrical, ⅙ in. long. Achenia terete, scabrous. Pappus ⅛ in. long, of 50 or more fine fragile whitish setæ.—Central Madagascar, *Baron* 1918! I have also seen a specimen of this in the Berlin herbarium under the name of *Moquinia adenocarpa*, Schultz Bip., gathered by Bernier.

VERNONIA MOQUINIOIDES, n. sp.

Fruticosa, ramulis albo-incanis, foliis breviter petiolatis oblongis vel lanceolatis subacutis integris facie viridibus glabris dorso albo-incanis, capitulis multifloris dense corymbosis pedicellis brevissimis, involucri campanulati bracteis multiseriatis rigidis subacutis adpressis tomentosis, pappi setis albidis hispidis exterioribus subulatis brevioribus.

A much-branched shrub, 3–6 feet high, with woody branchlets, coated with thin persistent whitish tomentum. Leaves very shortly petioled, oblong or lanceolate, 1½–2 in. long, ¼–¾ in. broad at the middle, entire, subacute, deltoid at the base, coriaceous, bright green and glabrous above, persistently matted with white tomentum beneath, triplinerved. Capitula in dense peduncled terminal corymbs, on very short pedicels. Involucre campanulate, ¼ in. in diam., ⅙ in. long; bracts 3–4-seriate, adpressed, densely tomentose. Corolla ¼ in. long, rather pilose, with 5 lanceolate teeth. Pappus of numerous brownish-white ciliated bristles ⅙–⅕ in. long, the outer ones much shorter than the inner.—Central Madagascar, *Baron* 1742! *Herb. Blackburn*! Between Antananarivo and Tamatave, on clay soil, alt. 3000 feet, *Dr. Meller*!

VERNONIA PACHYCLADA, n. sp.

Arborea, ramulis crassis dense brunneo-pilosis, foliis magnis petiolatis oblongis subacutis argute serratis subcoriaceis utrinque viridibus facie obscure dorso dense brunneo-pilosis, capitulis multifloris magnitudine mediocribus copiose corymboso-paniculatis, involucri campanulati bracteis 3–4-seriatis lanceolatis acutis brunneis dense pilosis, floribus pallidis, achenio glabro 10-costato glanduloso, pappi setis permultis albis flexuosis ciliatis.

A tree, with stout very thick straight woody branchlets densely clothed with brown silky hairs. Petiole 1–1½ in. long, densely pilose; blade 4–6 in. long, 2–3 in. broad at the middle, broadly rounded at the base, moderately firm in texture, rough with very short obscure hairs above, densely clothed with fine short brown hairs beneath, the arching 8–10-jugate main veins raised and parallel. Heads in a close terminal corymbose panicle ½ ft. long and broad, with densely pilose branches; pedicels sometimes an inch long. Involucre ⅓ in. in diam., ¼ in. long, the bracts acute, adpressed, densely clothed with brown silky hairs, the outer gradually shorter. Achene ⅛ in. long, drab, with 10 equal ribs. Pappus pure white, ¼ in. long, of very numerous pure white bristles.—Central Madagascar, *Baron*! Allied to *V. arborea* and *tanalensis*.

VERNONIA BRACHYSCYPHA, n. sp.

Arborea, ramulis brunneo-pilosis, foliis magnis petiolatis obovato-oblongis subacutis serratis membranaceis facie scabrulis dorso tenuiter brunneo-pilosis utrinque viridibus, capitulis multifloris magnitudine mediocribus laxe corymboso-paniculatis pedicellis elongatis, involucri late campanulati bracteis 3–4-seriatis adpressis acutis brunneis pilosis exterioribus sensim brevioribus, floribus pallidis quam involucrum triplo longioribus, achenio glabro, pappi setis albis flexuosis ciliatis.

A tree, with terete woody branches densely clothed with short bright brown hairs. Petiole 1–1½ in. long; blade 6–8 in. long, 3–4 in. broad, narrowed gradually from the middle to the base, thin in texture, dark green above and rough with minute raised points, finely pilose beneath. Heads in lax corymbose terminal panicles, with densely pilose slender pedicels which are sometimes an inch long. Flowers 50 or more in a head. Involucre ⅓ in. broad, ¼ in. long; bracts membranous, acute, densely pilose, the outer gradually smaller. Achene glabrous, 4-angled, ⅛ in. long. Pappus ¼ in. long, of numerous pure white flexuose bristles.—Central Madagascar, *Baron* 1694! Group of *V. arborea* and *V. tanalensis*.

VERNONIA FUSCO-PILOSA, n. sp.

Arborea, ramulis fusco-pilosis, foliis petiolatis oblanceolato-oblongis acutis serrulatis utrinque viridibus tenuiter pilosis, capitulis multifloris laxe corymbosis pedicellis elongatis, involucri campanulati bracteis 3–4-seriatis acutis adpressis fusco-pilosis, pappi aristis multis hispidis ciliatis albis paucis exterioribus parvis.

A tree 30–40 feet high, with woody branchlets densely clothed with fine short brown hairs. Leaves distinctly petioled, reaching a length of 5–6 inches and a breadth of 2–2½ in. above the middle, acute, distinctly serrated, narrowed gradually from the middle to the base, membranous, dark green and finely pubescent on both surfaces. Capitula in lax peduncled corymbs about as long as the leaves; pedicels ½–1 in. long, like the peduncles densely clothed with short brown hairs. Involucre campanulate, ⅓ in. in diam., ⅙ in. long; bracts 3-seriate, membranous, adpressed, regularly imbricated, densely pubescent, inner lanceolate, outer small ovate. Achene glabrous, only seen immature. Pappus ⅙ in. long, of very numerous white ciliated bristles, the outer ones like the others, but much shorter.—Central Madagascar, *Baron* 1232! Forest of Andrangaloaka, *Dr. Parker*!

VERNONIA (§ DISTEPHANUS) OCHROLEUCA, n. sp.

Fruticosa, ramulis dense albo-tomentosis, foliis parvis ovatis sessilibus obtusis subcoriaceis integris triplinerviis utrinque tenuiter incanis, capitulis terminalibus multifloris magnitudine mediocribus corymbosis, involucri late campanulati bracteis permultis subæquilongis linearibus acutis dense albo-tomentosis, floribus luteis, achenio dense albo-sericeo, pappi rubelli setis rigidulis ciliatis.

A small erect shrub, with a cluster of the short branchlets of the year at the end of the leafless woody branches of the previous season. Leaves sessile, subcoriaceous, quite entire, an inch long, triplinerved above the base, dull green and thinly coated with whitish tomentum above, more densely so beneath. Capitula few, in dense terminal corymbs with densely pilose branches. Involucre ⅓ inch broad, not more than ⅙ in. long, composed of numerous subequal acute bracts densely matted with white tomentum. Flowers 100 or more in a head, yellow, with lanceolate teeth. Pappus ⅙ in. long, bright red, persistent, flexuose. Achene densely clothed with white silky hairs.—Central Madagascar, *Baron* 1831! A near ally of the Mauritian *Distephanus populifolius*, Cass.

Vernonia (§ Distephanus) inulæfolia, n. sp.

Fruticosa, ramulis dense breviter glanduloso-hispidis, foliis oblongo-spathulatis sessilibus subacutis subcoriaceis triplinerviis utrinque scabris venulosis copiose glandulosis, capitulis multifloris magnitudine mediocribus solitariis vel parce corymbosis, involucri late campanulati bracteis permultis lanceolatis acutis pilosis nigris subæquilongis, achenio sericeo, pappi rubelli setis gracilibus flexuosis.

A low shrub, with the lower part of the branchlets leafless, the upper parts with the sessile leaves near together up to the end. Leaves moderately firm and thick in texture, 2–3 in. long, an inch broad, narrowed spathulately to the subamplexicaul base, triplinerved above the base, entire or obscurely denticulate towards the tip, green and scabrous and densely glandular on both surfaces, with all the veinlets raised. Heads 1–3 on hispid peduncles at the end of the branches. Involucre $\frac{1}{2}$ in. in diam., $\frac{1}{4}$ in. long, of very numerous black acute adpressed pilose bracts. Flowers above 100 in a head. Corolla subcylindrical, $\frac{1}{4}$ in. long, the subulate styles exserted $\frac{1}{12}$ in. from the throat. Achene densely white-silky; pappus $\frac{1}{6}$ in. long, of 40–50 slender flexible ciliated reddish bristles.—Central Madagascar, *Baron* 2119!

Vernonia ? rhaponticoides, n. sp.

Fruticosa, ramis albido-incanis, foliis magnis oblongis acutis serrulatis glabris, capitulis magnis solitariis terminalibus pedunculatis, involucri late campanulati bracteis 2–3-seriatis rigidulis glabris adpressis æquilongis, exterioribus late ovatis, intimis lineari-oblongis vel lanceolatis, floribus splendide rubellis, achenio glabro, pappi setis exterioribus brevissimis, intimis filiformibus fragilibus rigidulis caducis brevibus.

A shrub, with straight woody branches clothed with thin whitish tomentum and leafy up to the top. Leaves alternate, shortly petioled, 4–6 in. long, $1\frac{1}{2}$–2 in. broad at the middle, acute, distinctly serrated, moderately firm in texture, green and glabrous on both surfaces. Capitula solitary, on short peduncles at the end of the branches. Involucre about an inch broad, half an inch long, the outer bracts as long as the inner, adpressed, ovate-orbicular, $\frac{1}{4}$–$\frac{1}{3}$ in. broad, brownish-black, glabrous, subrigid in texture, the inner much narrower and more membranous. Corolla bright red, $\frac{1}{2}$ in. long, with a cylindrical tube and lanceolate segments $\frac{1}{8}$ in. long. Achene terete, glabrous, $\frac{1}{6}$ in. long, the outer row a toothed collar, the inner of very fragile rigid whitish deciduous bristles not more than half as long as the corolla-tube.—

Central Madagascar, *Baron* 1759! A most distinct, peculiar and handsome species, not fitting very well into the genus on account of its pappus.

Psiadia salviæfolia, n. sp.

Fruticosa, ramulis dense pilosis, foliis breviter petiolatis lanceolatis acutis serratis penninerviis utrinque viridibus hispidis, capitulis parvis multifloris dense corymboso-paniculatis, pedicellis brevissimis, involucri campanulati bracteis 2–3-seriatis lineari-oblongis adpressis rigidulis pilosis, achenio glabro, pappi setis rubellis quam achenium duplo longioribus.

An erect much-branched shrub, with slender terete woody densely pilose branchlets. Leaves crowded, shortly petioled, 2–3 in. long, ½ in. broad, narrowed gradually from the middle to the apex and base, moderately firm in texture, green and very rough above, densely glandular and shortly hispid beneath, the main veins distant and arcuate. Capitula in very dense terminal corymbose panicles 2–3 in. broad; peduncles and short pedicels densely pilose. Involucre campanulate, $\frac{1}{12}$ in. long and broad; bracts firm in texture, pale brown, the outer gradually shorter. Flowers 20 or more in a head, many outer filiform with a very minute ligule. Achene glabrous, 4-angled, under ½ line long. Pappus reddish, $\frac{1}{12}$ in. long, of about 30 equal bristles.—Central Madagascar, *Baron* 2130!

Psiadia urticæfolia, n. sp.

Fruticosa, glabra, foliis haud viscosis ovatis acuminatis petiolatis serratis, capitulis in paniculas terminales corymbosas dispositis, pedicellis brevibus, involucri campanulati bracteis 2–3-seriatis lanceolatis adpressis albido-brunneis acutis pilosis, floribus centralibus tubulosis multis, filiformibus paucis, pappi setis albidis flori æquilongis.

A shrub 3–8 feet high, with glabrous terete purplish branches. Leaves alternate, distinctly petioled, 2–3 in. long, cuspidate rounded at the base, conspicuously serrated, moderately firm in texture, not viscous, green and glabrous on both surfaces, penninerved; secondary veins 6–8-jugate, ascending. Capitula numerous, arranged in a moderately dense terminal corymbose panicle; peduncle and short pedicels clothed with adpressed white cottony hairs. Involucre $\frac{1}{6}$ in. long and broad; bracts all lanceolate, acute, adpressed, slightly pubescent, moderately firm in texture, with a brown keel and pale margins. Central tubular flowers numerous; outer filiform flowers few; corolla $\frac{1}{8}$ in. long.

Achene only seen immature; pappus of numerous white bristles $\frac{1}{8}$ in. long.—Central Madagascar at Andrangaloaka, *Dr. Parker*!

MICROGLOSSA MIKANIOIDES, n. sp.

Fruticosa, sarmentosa, glabra, foliis sessilibus lanceolatis acutis integris utrinque viridibus, capitulis parvis 10–12-floris dense corymboso-paniculatis pedicellis brevibus, involucri campanulati bracteis paucis biseriatis lanceolatis rigidulis acutis exterioribus brevioribus, achenio glabro, pappo rubello setis flexuosis ciliatis.

A woody climber, glabrous in all its parts, with the habit of a *Mikania*, with slender terete branchlets. Leaves 2–3 in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. broad at the middle, narrowed gradually to both ends, thin in texture, green and quite glabrous on both surfaces, with fine immersed veins. Flowers in copious deltoid terminal panicles with corymbose branchlets. Involucre $\frac{1}{8}$ in. long and broad, with two rows of lanceolate acute glabrous bracts of firm texture, with greenish-drab edges and a nearly black keel. Achene terete, not seen fully mature. Pappus pale red, $\frac{1}{6}$ in. long, of numerous flexuose ciliated bristles.—Between Tankay and the east coast, *Baron* 1496! A near ally of *M. sessilifolia*, DC. (*Baron* 1524! 1541!).

MICROGLOSSA PSIADIOIDES, n. sp.

Fruticosa, ramulis hispidulis, foliis breviter petiolatis oblanceolato-oblongis acutis integris utrinque viridibus glanduloso-scabris, capitulis parvis 10-floris dense corymboso-paniculatis pedicellis nullis vel brevissimis, involucri campanulati bracteis 2–3-seriatis adpressis lanceolatis acutis viridibus exterioribus sensim brevioribus, floribus pallidis, achenio piloso, pappi setis albidis flexuosis ciliatis.

A sarmentose shrub, with slender terete brown branches, rough with short bristly hairs. Leaves 2–3 in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. broad, acute, narrowed gradually from the middle to the base, moderately firm in texture, green and rough with glands and minute bristly hairs on both surfaces. Flowers in terminal deltoid panicles, with numerous slender patent pilose corymbose branches. Involucre $\frac{1}{8}$ in. long and broad, the bracts very acute, drab with a green keel, the inner ones glabrous, the outer pilose on the back. Achene pilose, not seen mature. Pappus $\frac{1}{8}$ in. long, of numerous whitish flexuose bristles.—Between Tankay and the east coast, *Baron* 1529!

HELICHRYSUM TRINERVATUM, n. sp.

Fruticosum, ramis gracilibus lignosis dense albo-pilosis, foliis confertis parvis sessilibus lanceolatis rigidulis plerisque squarrosis facie glabris trinervatis margine revolutis dorso albo-pilosis, capitulis parvis 7–8-floris in paniculam densam terminalem corymbosam aggregatis, pedicellis brevissimis, involucri oblongi bracteis 3–4-seriatis oblongis obtusis adpressis luteis, receptaculi paleis lanceolatis, pappi albi ciliis flori subæquilongis.

Shrubby, with long slender erect terete woody branches, densely clothed with short white hairs. Leaves of the lower half of the stem crowded, squarrose, $\frac{1}{4}$–$\frac{1}{3}$ in. long, narrowed gradually from a clasping base to an acute point, subcoriaceous, green and glabrous on the upper surface, with distinctly revolute edges, the under surface covered with dense hairs like those of the stem, the leaves of the upper half of the stem more distant and erect. Capitula massed in a dense terminal corymbose panicle. Involucre oblong, $\frac{1}{8}$ in. long; bracts all adpressed and obtuse, the inner bright yellow. Scales of the receptacle lanceolate, acute, $\frac{1}{2}$ lin. long. Flowers nearly or quite all hermaphrodite, with subcylindrical yellow corollas, shortly toothed at the tip. Achene minute, glabrous. Pappus of white bristles about as long as the corolla.—Central Madagascar, *Baron* 1258! Allied to *H. phylicæfolium*, DC. Prod. vi. 207.

HELICHRYSUM TANACETIFLORUM, n. sp.

Herbaceum, perenne caulibus simplicibus erectis albo-incanis, foliis sessilibus integris viridibus facie glabris dorso albo-incanis inferioribus oblanceolatis superioribus linearibus sensim minoribus, capitulis permultis minutis 8–10-floris in glomerulum globosum terminalem aggregatis, involucri oblongi bracteis paucis oblongis obtusis adpressis croceis, receptaculi paleis parvis lanceolatis, achenio glabro, pappi setis albidis flexuosis.

A perennial herb, with slender erect simple stems about a foot long, matted with persistent white tomentum. Leaves sessile, close in the lower part of the stem, oblanceolate, obtuse, about an inch long, those of its upper half small, distant, linear and adpressed. Heads very numerous, congested into a simple or lobed globose terminal capitulum. Involucre oblong, $\frac{1}{12}$ in. long, cottony, especially at the base; bracts few, oblong, obtuse, dark yellow towards the tip. Scales of the receptacle lanceolate, acute, not more than half as long as the flowers. Achene minute. Pappus of numerous whitish bristles as long as the corolla.—Central Madagascar, *Baron* 1866!

HELICHRYSUM FLAGELLARE, n. sp.

Herbaceum, perenne, caulibus elongatis gracilibus albo-incanis, foliis

distantibus sessilibus linearibus uninerviis acutis facie tenuiter dorso dense albo-incanis, capitulis multifloris dense corymbosis, involucri campanulati bracteis 3–4-seriatis oblongis obtusis fulvis inferne albo-incanis superne glabris, pappi setis rubellis floribus subæquilongis.

A perennial herb, with long slender branches trailing in the lower part, densely matted with persistent white tomentum. Leaves distant, sessile, spreading, linear, 1-nerved, acute, not rigid in texture, $\frac{3}{4}$–1 in. long, $\frac{1}{12}$ in. broad, narrowed from the middle to the base, densely matted with white tomentum like that of the stem beneath, and thinly on the upper surface. Capitula 6–12 in dense terminal corymbose panicles; peduncles at most as long as the heads. Involucre campanulate, $\frac{1}{6}$ in. long and broad, white-canescent towards the base; inner bracts membranous, fulvous, obtuse and glabrous in the upper half. Flowers not seen fully developed. Pappus of numerous reddish bristles as long as the corolla.—Central Madagascar, *Baron* 453! Allied to *H. emirnense* and *H. fulvescens*, DC. Prod. vi. 207.

HELICHRYSUM SQUARROSUM, n. sp.

Suffruticosum, ramulis gracilibus albo-incanis, foliis parvis sessilibus rigidis lanceolatis uninerviis facie glabris dorso albo-incanis inferioribus squarrosis, capitulis multifloris dense corymboso-paniculatis, involucri campanulati bracteis 3–4-seriatis albis obtusis patulis, receptaculi paleis lanceolatis quam achenium longioribus, pappi setis albis quam achenium longioribus.

A small shrub 1–2 ft. high, with long slender erect terete branchlets matted with close persistent white pubescence. Leaves rigid in texture, with slightly recurved margins, green and glabrous above, white like the branchlets beneath, the lower ones crowded, recurved or spreading, $\frac{1}{6}$–$\frac{1}{4}$ in. long, $\frac{1}{2}$ line broad, the upper ascending and erect, those towards the panicle very small and adpressed. Heads 20–40 in a dense terminal corymbose panicle; peduncles at most as long as the capitulum. Involucre $\frac{1}{6}$ in. long and broad; bracts 3–4-seriate, the outer ovate, adpressed, the inner oblong, obtuse, white and spreading in the upper half. Tubular corollas yellow, $\frac{1}{8}$ in. long. Bristles of the pappus white, as long as the corolla.—Andrangaloaka, *Dr. Parker*! Allied to *H. retrorsum*, DC. Prod. vi. 207.

HELICHRYSUM BULLATUM, n. sp.

Herbaceum, perenne, ramis gracilibus albo-pilosis, foliis parvis reflexis lanceolatis amplexicaulibus bullatis margine revolutis facie tenuiter dorso dense pubescentibus, capitulis minutis 9–10-floris dense corymboso-pani-

culatis, involucri glabri campanulati bracteis imbricatis albis obtusis dorso convexis, receptaculi paleis lanceolatis, pappi setis albidis flori æquilongis.

An herbaceous perennial, with slender terete stems, clothed with short white cottony pubescence. Leaves distant, all reflexed, $\frac{1}{4}$–$\frac{1}{3}$ in. long, 1-nerved, cordate at the base and clasping the stem, rugose, dull green, clothed with white cottony pubescence like that of the stem on both surfaces. Heads very numerous, arranged in dense terminal corymbose panicles 1–2½ in. in diam.; peduncles at most as long as the capitula. Involucre glabrous, $\frac{1}{12}$ in. long; bracts 3–4-seriate, oblong, obtuse, white, glossy, the outer rows gradually shorter. Paleæ of the receptacle as long as the achene. Achene cylindrical, glabrous. Corolla and pappus $\frac{1}{12}$ in. long.—Central Madagascar, *Baron* 1045! Allied to *H. fulvescens*, DC.

HELICHRYSUM PATULUM, n. sp.

Fruticosum, ramulis foliisque persistenter albido-tomentosis, foliis patulis cordato-amplexicaulibus parvis ovatis integris mucronatis, capitulis multifloris dense corymboso-paniculatis pedicellis brevissimis, involucri campanulati bracteis 3-4-seriatis obtusis deorsum adpressis pilosis sursum citrinis glabris patulis, receptaculi paleis magnis lanceolatis, pappi setis flori æquilongis.

A much-branched erect shrub, with the slender branchlets and leaves on both sides densely matted with persistent whitish tomentum. Leaves sessile, crowded, especially on the flowerless branches, spreading or deflexed, $\frac{1}{4}$–$\frac{1}{3}$ in. long, strongly amplexicaul, minutely mucronate, only the midrib visible. Heads in dense corymbose panicles 1½–3 in. broad, with very short pedicels. Flowers 30 or more in a head. Involucre campanulate, $\frac{1}{8}$ in. long and broad, the bracts dull-coloured and pilose downwards, all with obtuse spreading glabrous pale yellow tips. Scales of the receptacle lanceolate, rigid, acute, nearly as long as the flowers.—Central Madagascar, *Baron* 1877! A near ally of *H. Bojerianum*, DC. Prod. vi. 208.

HELICHRYSUM AMPLEXICAULE, n. sp.

Fruticosum, ramulis foliisque dense persistenter albo-incanis, foliis parvis cordato-amplexicaulibus ovatis acutis parce bullatis patulis vel deflexis, capitulis multifloris multis dense corymboso-paniculatis pedicellis brevissimis, involucri campanulati bracteis multiseriatis adpressis obtusis citrinis, receptaculi paleis magnis lanceolatis, pappi setis flori æquilongis.

An erect much-branched shrub, with leaves and branchlets coated with persistent white tomentum. Leaves crowded, especially on the barren branches, spreading or deflexed, $\frac{1}{2}$ in. long, broad ovate, cordate-amplexicaul, mucronate, matted with white stellate tomentum, especially on the under surface, rather bullate, the side veins not visible, and the midrib indistinct. Heads very numerous, arranged in a dense corymbose panicle $1\frac{1}{2}$–2 in. in diam. Involucre globose, $\frac{1}{6}$ in. long and broad, the bracts in several rows, oblong, obtuse, pale yellow and glabrous in the upper half. Flowers 30 or more in a head. Scales of the receptacle lanceolate, acute, $\frac{1}{2}$ line long.—Central Madagascar, *Baron* 2069! Like the last, a near ally of *H. Bojerianum*, DC.

HELICHRYSUM CRYPTOMERIOIDES, n. sp.

Fruticosum, ramosissimum, ramulis erectis foliis adpressis occultis, foliis crebris rigidis linearibus acuminatis junioribus villosis senioribus calvatis, capitulis solitariis multifloris terminalibus, involucri campanulati bracteis multiseriatis rigidis adpressis albis obtusis glabris, pappi setis albis caducis.

A very much-branched erect shrub, the branchlets with their adpressed rigid dark-green linear crowded leaves much resembling those of *Cryptomeria japonica*, closely leafy up to the very top. Young leaves densely clothed with loose white woolly hairs; old dark green and glabrous. Leaves $\frac{1}{3}$–$\frac{1}{2}$ in. long, rigid, very acuminate, rounded on the back, channelled down the face, with only the midrib visible. Capitula solitary in the axils of the ultimate whorl of branchlets, almost hidden by the leaves. Involucre campanulate, $\frac{1}{3}$ in. in diam.; bracts multiseriate, oblong, obtuse, $\frac{1}{8}$–$\frac{1}{6}$ in. long, pure white, scariose, glabrous, persistent. Achene minute. Pappus of pure white caducous bristles as long as the corolla.—Central Madagascar, *Baron* 2027! In habit and foliage, but not in the capitula and involucre, this resembles most *Aphelexis selaginifolia* and *A. lycopodioides*, DC. Prod. vi. 217.

STENOCLINE FRUTICOSA, n. sp.

Fruticosa, erecta, ramulis hispidis, foliis breviter petiolatis oblongis integris subcoriaceis facie glabris dorso incanis, capitulis trifloris densissime glomerato-paniculatis, involucri cylindrici bracteis ferrugineis nitidis imbricatis obtusis, pappi setis rubellis basi in annulum concretis.

A much-branched erect shrub, with branchlets densely clothed with short brown bristly hairs. Leaves shortly petioled, crowded, oblong, subcoriaceous, obtuse, cuneate at the base, about an inch long, green and glabrous on the upper surface, matted with persistent whitish-brown tomentum beneath. Heads very numerous, densely crowded in clusters, arranged in a dense terminal panicle. Flowers 3 in a head, all fertile. Involucre $\frac{1}{8}$ in. long, formed of 12–15 obtuse glossy ferruginous rigid bracts, the inner linear-oblong, the outermost minute. Corolla cylindrical in the lower half, funnel-shaped in the upper half, with 5 small lanceolate teeth. Pappus of numerous red bristles $\frac{1}{12}$ in. long, connate at the base so that they all fall together.—Central Madagascar, *Baron* 406! Allied to *S. gymnocephala*, DC. Prod. vi. 218.

STENOCLINE INCANA, n. sp.

Fruticosa, erecta, ramulis albo-incanis, foliis confertis subpetiolatis lanceolatis triplinerviis utrinque albo-incanis, capitulis 5–6-floris sessilibus dense glomerato-paniculatis, involucri infundibularis bracteis 3–4-seriatis imbricatis albidis, pappi setis albidis flori æquilongis.

A much-branched erect shrub, with ascending terete branchlets, thinly coated with persistent whitish tomentum. Leaves crowded, obscurely petioled, lanceolate, acute, flat, entire, narrowed gradually from the middle to the base, triplinerved in the lower half, moderately firm in texture, thinly coated above and more densely beneath with persistent whitish tomentum. Heads very numerous, sessile, arranged in clusters that form a dense terminal corymbose panicle. Flowers 5–6 in a head, all fertile. Involucre funnel-shaped, $\frac{1}{8}$ in. long, pilose in the lower part, glabrous above; outer bracts small, ovate; inner white, oblanceolate, obtuse. Receptacle furnished with minute paleæ. Pappus of numerous white bristles $\frac{1}{12}$ in. long.—Central Madagascar, *Baron* 550! There seems to be no clear line of demarcation between *Stenocline* and *Helichrysum*; and probably the two genera will have to be united.

STENOCLINE FERRUGINEA, n. sp.

Fruticosa, ramosissima, ramulis apice incanis, foliis parvis breviter petiolatis subcoriaceis oblongis vel oblongo-lanceolatis subobtusis facie obscure albido-incanis dorso dense persistenter pallide ferrugineo-incanis, capitulis paucifloris permultis minutis dense glomerato-paniculatis, involucri oblongi bracteis nitidis glabris citrinis exterioribus sensim brevioribus, achenio minuto glabro, pappi setis albis flori æquilongis.

A much-branched erect shrub, the slender ultimate branchlets coated with pale ferruginous tomentum. Leaves close, shortly petioled, about ½ in. long, subcoriaceous, flat, dull green and obscurely tomentose above, densely matted with pale ferruginous tomentum beneath, only the midrib visible. Capitula very numerous, aggregated in small dense terminal flat-topped clusters. Involucre $\frac{1}{12}$ in. long, composed of 10–12 shining bright yellow glabrous scariose bracts, the outer minute, ovate, obtuse; the inner ovate-lanceolate. Flowers only seen in an early stage. Central Madagascar, *Baron* 1811! 2068! Closely allied to *S. fruticosa* and *S. incana.*

SIEGESBECKIA EMIRNENSIS, n. sp.

Erecta, ramosa, ramulis junioribus solum pubescentibus, foliis ovatis membranaceis basi in petiolum alatum attenuatis, capitulis paucis corymbosis 30–40-floris, involucri bracteis exterioribus oblanceolatis foliaceis pilosis haud glandulosis quam interiores oblongæ membranaceæ duplo longioribus, floribus omnibus discoideis, corollæ tubo glanduloso limbo campanulato.

A much-branched erect annual herb, with only the young branchlets pubescent. Leaves opposite, ovate, acuminate, minutely serrated, membranous, nearly glabrous, 3–4 in. long, narrowed at the base into a winged petiole. Capitula in sparse corymbs at the end of the branches, 30–40-flowered. Involucre campanulate, $\frac{1}{6}$–$\frac{1}{5}$ in. in diam., the 5 outer bracts foliaceous, oblanceolate, $\frac{1}{6}$ in. long, pilose, but none of the hairs glandular; the inner oblong, subacute, $\frac{1}{12}$ in. long, clasping the outer achenes. Flowers all discoid, with a glandular cylindrical tube and a bright yellow campanulate limb not more than ¼ line long, with deltoid teeth. Achenes black, glabrous, gibbous towards the outside of the capitulum.—Central Madagascar, *Baron* 902! Allied to the Abyssinian *S. abyssinica* of Oliver and Hiern (*Limnogenneton abyssinicum*, Schultz Bip. in Walp. Rep. vi. 147).

ASPILIA BARONI, n. sp.

A. caulibus decumbentibus gracillimis adpresse hispidis, foliis oppositis petiolatis acutis serratis utrinque hispidis inferioribus ovatis superioribus lanceolatis, capitulis solitariis longe pedunculatis, involucri bracteis lanceolatis quam discus longioribus, ligulis 8–10, achenio piloso cylindrico, pappo minuto coroniformi dentato.

A much-branching decumbent perennial herb, with slender stems, rough with short bristly hairs. Leaves in distant pairs, distinctly petioled, about an inch long, the lower ⅓ in., the upper ⅙ in. broad, green and rough on both sides with short bristly hairs. Heads terminal, on long slender naked peduncles. Involucre $\frac{1}{3}$ in. long, of two rows of adpressed lanceolate green rather hispid subfoliaceous bracts, the inner rather shorter than the outer. Ligules bright yellow, $\frac{1}{4}$–$\frac{1}{3}$ in. long, with a rudimentary style and small pilose achene. Scales of the receptacle lanceolate, acute, as long as the disk-flowers. Immature achene cylindrical, densely pilose, crowned by a minute dentate coroniform pappus.—Central Madagascar, *Baron* 2084! A near ally of *A. Bojeri*, DC., which Mr. Baron has also gathered (1876!), but with an involucre nearly as long as the ray-flowers.

EPALLAGE HUMIFUSA, n. sp.

Perennis, caulibus decumbentibus pubescentibus parce ramosis, foliis petiolatis ovatis obtusis inciso-crenatis membranaceis utrinque viridibus parce pilosis, capitulis solitariis terminalibus longe pedunculatis, involucri late campanulati bracteis biseriatis lineari-oblongis subæquilongis obtusis, ligulis 10–20 oblanceolatis, achenio glabro subcylindrico, pappo coroniformi dentato.

A perennial herb, with very slender trailing shortly pubescent stems, with ascending monocephalous branches. Leaves alternate; petiole about $\frac{1}{2}$ in. long; blade $\frac{1}{2}$–$\frac{3}{4}$ in. long, broad ovate, truncate or slightly cordate at the base, always obtuse, deeply crenated, membranous, green and obscurely pubescent on both surfaces. Heads solitary at the end of slender erect peduncles 2–4 in. long. Involucre broadly campanulate, $\frac{1}{3}$ in. in diam., $\frac{1}{6}$ in. long; bracts biseriate, obtuse, slightly hispid, rigid in the lower part, foliaceous towards the tip. Ligules bright yellow, $\frac{1}{6}$ in. long, with a small achene and unbranched style. Scales of the receptacle rigid, as long as the disk-flowers, sometimes lacerated at the tip. Achene glabrous, subcylindrical, with a minute coroniform paleaceous pappus.—East coast of Madagascar, *Baron* 1513! 1595! Mr. Baron has also collected the allied *E. dentata*, DC., several times (641, 910, 952, 982) and *E. anemonæfolia*, DC., once (1988!). Dr. Parker has sent us the latter under the native name of "marovolena."

EPALLAGE MINIMA, n. sp.

Annua, erecta, hispida, copiose ramosa, foliis parvis petiolatis utrinque hispidis inferioribus ovatis dentatis superioribus lanceolatis, capitulis solitariis terminalibus longe pedunculatis, involucri late campanulati bracteis subæquilongis lineari-oblongis obtusis hispidulis apice foliaceis, ligulis parvis obovatis, achenio glabro clavato, pappo coroniformi dentato.

An erect annual, not more than 3–4 in. high, much branched in the lower part, with very slender pilose stems. Leaves alternate, petiole, ovate, oblong or lanceolate, always cuneated at the base, not more than $\frac{1}{4}$–$\frac{1}{3}$ in. long, membranous, dark green and hispid on both surfaces, all but the very uppermost dentate. Heads solitary, terminal on slender naked erect peduncles 1–2 in. long. Involucre broadly campanulate, $\frac{1}{6}$ in. in diam., $\frac{1}{8}$ in. long; bracts biseriate, linear-oblong, hispid, rigid in texture, foliaceous towards the tip. Ligules 10–12, with a bright yellow obovate lamina $\frac{1}{12}$ in. long. Paleæ of the receptacle rigid, lanceolate, as long as the disk-flowers. Achene clavate, glabrous, with a minute coroniform pappus.—Central Madagascar, a couple of specimens of old date in the Kew herbarium, without the name of the collector.

EMILIA AMPLEXICAULIS, n. sp.

Annua, glabra, ramosa, foliis magnis membranaceis oblongis acutis dentatis amplexicaulibus profunde cordatis, capitulis solitariis terminalibus longe pedunculatis, involucri campanulati bracteis lanceolatis, floribus aurantiacis vel pallide flammeis, achenio cylindrico glabro, pappi setis albis mollibus deciduis.

A branched annual, with slender terete stems, glabrous in all its parts. Leaves membranous, green and glabrous on both surfaces, oblong-spathulate, with two large orbicular obtuse basal lobes projecting on the other side of the stem, the lower ones 3–4 in. long, the upper gradually smaller. Capītula large for the genus, solitary, at the end of long erect naked peduncles. Involucre $\frac{1}{3}$ in. long and broad, composed of about 10 uniseriate oblanceolate green bracts with a deltoid apex; calyculus none. Flowers $\frac{1}{2}$ in. long, bright yellow or tinged with red. Achene $\frac{1}{12}$ in. long, glabrous, distinctly costate. Pappus $\frac{1}{4}$ in. long, pure white, of numerous fine soft fragile bristles. Corolla with a long slender tube and short limb with 3–5 lanceolate teeth.—Central Madagascar, on grassy hills, frequent, *Bojer*! *Meller*! *Baron* 1603! A near ally of the well-known Indian and African *E. sagittata*, DC.

SENECIO CURVATUS, n. sp.

Fruticosus, glaber, foliis petiolatis oblongis acutis subcoriaceis dentatis, capitulis discoideis 4-floris permultis dense corymboso-paniculatis sessilibus vel brevissime pedunculatis, involucri infundibularis bracteis 5–6 lan-

ceolatis, floribus quam involucrum duplo longioribus, achenio glabro, pappo albo.

A shrub, glabrous in all its parts, with slender terete woody branchlets. Leaves distinctly petioled, 2–3 in. long, subcoriaceous, green on both surfaces, rounded at the base, sharply serrated, with numerous distinct erecto-patent main veins. Heads very numerous, forming an ample panicle 6–9 in. long, with a very flexuose woody rhachis and copiously compound spreading or deflexed main branches subtended at the base by reduced leaves. Involucre $\frac{1}{12}$ in. long; bracts brownish, subcoriaceous. Flowers $\frac{1}{6}$ in. long. Pappus white, twice as long as the glabrous achene.—Central Madagascar, *Baron*!

SENECIO ANAMPOZA, n. sp.

Herbaceus, glaber, caulibus elatis gracilibus ramosis, foliis distantibus petiolatis membranaceis utrinque viridibus, inferioribus lyrato-pinnatis lobo terminali maximo orbiculari repando-dentato, capitulis multifloris discoideis pluribus laxe corymbosis, involucri campanulati bracteis linearibus circiter 15, floribus discoideis involucro æquilongis, pappo albo quam achenium glabrum duplo longiore.

A tall perennial herb, glabrous in all its parts, with slender erect fistulose terete branched stems. Leaves membranous, green on both surfaces, obtuse, distinctly petioled; lower lyrate-pinnate, with the orbicular repand-dentate terminal lobe much larger than the oblong side ones; upper leaves simple. Capitula arranged in a lax terminal corymb; peduncles always longer than the heads, with only a few minute linear bracts. Involucre campanulate, $\frac{1}{3}$ in. long and broad; inner bracts about 15, green, linear, glabrous; outer whorl of a few minute linear bracts. Achenes glabrous, blackish, $\frac{1}{8}$ in. long; pappus soft, pure white, twice as long as the achene.—Central Madagascar, in forests of the province of Imerina, *Parker*! *Baron* 1234! 1271! 2113! Native name "anampoza."

SENECIO PARKERI, n. sp.

Fruticosus, glaber, foliis petiolatis oblongo-lanceolatis acutis denticulatis membranaceis utrinque viridibus, capitulis radiatis dense corymboso-paniculatis pedunculis brevissimis, involucri campanulati bracteis 9–10 brunneis lanceolatis, ligulis paucis parvis luteis, floribus discoideis multis quam involucrum duplo longioribus, achenio glabro, pappo albo.

A subscandent shrub, glabrous in all its parts. Stem-leaves distinctly petioled, 3–4 in. long. 1 in. broad, narrowed gradually from the middle to the tip, deltoid at the base, green on both surfaces, finely veined, distantly denticulate. Capitula numerous, forming a dense terminal panicle, with corymbose branches, short peduncles and a few small lanceolate bracts. Involucre campanulate, $\frac{1}{6}$ in. long; inner bracts brown, glabrous, lanceolate, subtended by an outer whorl less than half as long. Ray-florets 6–8, small, bright yellow. Achene glabrous, cylindrical; pappus soft, pure white, $\frac{1}{4}$ in. long, equalling the tubular flowers in length, twice as long as the achene.—Andramasina, Central Madagascar, *Dr. Parker*!

SENECIO POLYRHIZUS, n. sp.

Herbaceus, perennis, glaber, caule gracili parce folioso, foliis elongatis lineari-subulatis integris margine revolutis, capitulis 2–4 terminalibus radiatis longe pedunculatis corymbosis, involucri campanulati bracteis lanceolatis 12–15, ligulis 8–10 luteis, floribus discoideis permultis involucro subæquilongis, achenio glabro, pappo albo.

A slender erect perennial herb, with very slender unbranched stems $1\frac{1}{2}$–2 ft. long. Leaves mainly in a basal rosette, 5–6 in. long, firm in texture, with conspicuously revolute entire edges; stem-leaves few, sessile, ascending, similar but growing gradually smaller up the stem, the uppermost not more than an inch long. Heads terminal, corymbose, on long peduncles, with a few minute linear bracts. Involucre campanulate, $\frac{1}{3}$ in. long and broad; inner bracts greenish, glabrous, acute, with a whorl of minute outer bracts at the base. Ligules bright yellow, about as long as the involucre. Achene glabrous, cylindrical, $\frac{1}{6}$ in. long. Pappus soft, pure white, $\frac{1}{4}$ in. long.—Central Madagascar, *Baron* 1066! Allied to *S. emirnensis* and *S. angavoniensis*, DC. Prod. vi. 377.

SENECIO MULTIBRACTEATUS, n. sp.

Herbaceus, perennis, parce floccosus, foliis caulinis lanceolatis crebre denticulatis sessilibus basi auriculato-amplexicaulibus, capitulis multis radiatis in paniculam corymbosam pedunculis elongatis erectis multibracteatis dispositis, involucri campanulati bracteis 15–20, ligulis paucis parvis luteis, floribus discoideis multis involucro æquilongis, achenio glabro, pappo albo quam flos breviore.

An erect perennial herb, with moderately stout slightly floccose stems. Stem-leaves many, ascending, sessile, moderately firm in texture, 3–4 in. long, narrowed gradually from the middle to an auriculate-amplexicaul base. Capitula very numerous, arranged in a dense terminal panicle, with long ascending peduncles furnished with numerous minute erecto-patent linear bracts. Involucre campanulate, $\frac{1}{4}$ in. long and broad; bracts 15–20, lanceolate, brownish, glabrous. Ligules yellow, shorter than the involucre. Disk-flowers numerous, longer than the involucre. Pappus pure white, $\frac{1}{6}$ in. long, much shorter than the disk-flowers.—Central Madagascar, *Baron*! Habit and leaves of *S. longiscapus*, Bojer, but capitula very different. This latter has been refound by Baron (1684); but I am not at all certain that it is not simply a discoid variety of *S. cochlearifolius*, Bojer (Baron 1534).

GERBERA (§ LASIOPUS) HYPOCHŒRIDOIDES, n. sp.

G. rhizomate tuberoso lanoso, foliis rosulatis petiolatis oblongis obtusis obscure repandis basi rotundatis facie viridibus glabris dorso persistenter albo-incanis, pedunculo elongato albo-incano, involucri bracteis 3–4-seriatis lanceolatis acutis intimis glabris exterioribus leviter incanis sensim brevioribus, achenio compresso glabro distincte rostrato.

An erect perennial herb, with a globose tuberous rootstock, densely clothed with white woolly hairs, and a dense tuft of long cylindrical root-fibres. Leaves six or eight in a basal rosette on petioles $\frac{1}{2}$–1 in. long, densely clothed with persistent white tomentum; blade 1–2 in. long, moderately firm in texture, rounded at both ends, subentire or indistinctly repand, green and glabrous on the upper surface, clothed with persistent white tomentum beneath. Peduncle slender, erect, sometimes a foot long. Involucre $\frac{1}{2}$ in. long, formed of several rows of adpressed lanceolate acute bracts, the inner glabrous and tinged with red, the outer small ones nearly black and thinly coated with white tomentum. Achene $\frac{1}{4}$ in. long, distinctly flattened and conspicuously ribbed. Pappus $\frac{1}{4}$ in. long, of very numerous flexuose whitish scabrous bristles.—Central Madagascar, *Baron* 2088! 2126! Allied to *Lasiopus Bojeri*, DC. Prod. vii. 19, and the Cape *L. ambiguus* of Cassini.

LIGHTFOOTIA SUBAPHYLLA, n. sp.

Perennis, glabra, caulibus simplicibus erectis foliis paucis minutis lineari-subulatis solum præditis, floribus laxe cymoso-paniculatis, bracteis minutis linearibus, ovario globoso semisupero triloculari, calycis tubo campanulato dentibus lineari-lanceolatis quam tubus longioribus, corolla fere ad basin 5-partita, segmentis lanceolatis.

An erect perennial herb, with slender terete stems a foot long, simple below the panicle, furnished only with a few very minute linear-subulate sessile leaves. Panicle lax, about 3 in. long, with several centrifugal few-flowered erecto-patent branches, the end-flowers on short, the side ones on long pedicels, subtended by minute persistent linear bracts. Flower-calyx $\frac{1}{8}$ in. long, with a campanulate tube and 5 erect lanceolate-acuminate teeth $\frac{1}{12}$ in. long. Corolla more than twice as long as the calyx-teeth, cut down nearly to the base into 5 lanceolate segments. Style nearly as long as the corolla, 3-lobed at the tip.—Central Madagascar, *Baron* 2146! A second Madagascar species of this Cape genus. Mr. Baron has also lately gathered *L. madagascariensis*, A. DC. (1543), and *Lobelia Hartlaubi* of Buchenau (1380, 1487), and several times *Dialypetalum* of Bentham, a curious monotypic endemic Madagascar genus of Campanulaceæ. *Wahlenbergia madagascariensis*, A. DC. (Baron 1796!), appears to be conspecific with the Cape *W. oppositifolia*.

VACCINIUM EMIRNENSE, *Hook. Ic.* t. 131.

Mr. Baron has gathered this several times, 964, 1132, 1316, 1460, slightly differing forms. Dr. Parker sends it under the native name of "voakelonda." *V. Forbesii*, Hook. Ic. t. 345, appears to be a mere form of the same species; and probably the specimens were gathered by Forbes in Madagascar, and not in Mozambique. According to a note of Dr. Meller's, it attains a height of 20 or 30 feet, and occurs not only in the interior but in the low country near the coast in the vicinity of Tamatave. Mr. Baron and Dr. Parker have also gathered *V. secundiflorum*, Hook. Ic. t. 134, several times; and Mr. Baron has lately (1850) regathered Bojer's *V. fasciculatum*, a dwarf species with small very rigid serrated lanceolate leaves.

AGAURIA POLYPHYLLA, n. sp.

A. ramulis puberulis, foliis confertis patulis subsessilibus rigide coriaceis cordato-oblongis acutis, racemis axillaribus folio subæquilongis, pedicellis brevissimis, calycis campanulati tubo brevissimo dentibus ovatis, corollæ urceolatæ segmentis deltoideis, fructu 5-valvi depresso-globoso.

A shrub, with woody branchlets, thinly matted with whitish tomentum. Leaves crowded, spreading, alternate, very rigid in texture, obscurely petioled, acute, slightly cordate at the base, 1–1$\frac{1}{2}$ in. long, green and glabrous above, thinly coated with whitish tomentum beneath. Racemes spreading, from the axils of a few of the upper leaves, 1–1$\frac{1}{2}$ in. long, with an angled pilose rhachis, lanceolate membranous brown bracts, and very short pedicels. Calyx broadly campanulate, $\frac{1}{12}$ in. in diam.; segments ovate, acute, pilose. Corolla urceolate, $\frac{1}{4}$ in. long. Stamens nearly as long as the corolla-tube, with a pilose lanceolate filament twice as long as the oblong bifid anther. Capsule $\frac{1}{3}$ in. in diam., $\frac{1}{6}$ in. long, split down to the base into 5 rigid valves.—Central Madagascar, *Baron* 896! A near ally of *A. buxifolia* (*Andromeda buxifolia*, Bot. Mag. t. 2660).

PHILIPPIA (§ EUPHILIPPIA) MACROCALYX, n. sp.

Fruticosa, ramosissima, ramulis albo-incanis, foliis sessilibus verticillatis 4nis minutis oblongis cauli adpressis rigidis obtusis glabris margine late recurvatis, floribus terminalibus capitatis, calycis segmentis 4 magnis ovatis vel oblongis, corollæ segmentis quam tubus duplo brevioribus, staminibus inclusis connatis, stylo flori æquilongo.

A very much-branched erect shrub, with the slender branchlets coated with white tomentum. Whorls of leaves so close that they quite hide the upper part of the branchlets; leaves adpressed not more than $\frac{1}{2}$ line long, rigid, dark green, obtuse, with the margins so much recurved that they quite hide the back. Flowers 2–4, sessile at the tips of the branches. Calyx as long as the corolla, glabrous, of 4 rigid oblong or ovate obtuse segments. Corolla under $\frac{1}{12}$ in. long, the four oblong segments half as long as the tube. Stamens as long as the corolla-tube, with oblong emarginate brown anthers and very short deltoid filaments. Style just reaching to the top of the corolla, with a large exserted peltate stigma. Capsule 4-valved, as long as the corolla.—Central Madagascar, *Baron* 1804!

PHILIPPIA (§ ELEUTHEROSTEMON) OOPHYLLA, n. sp.

Fruticosa, ramosissima, ramulis glanduloso-puberulis, foliis sessilibus verticillatis 2–4nis minutis patulis oblongis acutis haud aristatis margine valde recurvatis facie glabris dorso albido-incanis, floribus in umbellas terminales 2–4-floras dispositis, calycis dentibus parvis deltoideis, corollæ globosæ dentibus parvis deltoideis, staminibus liberis inclusis, stylo conspicue exserto.

A very densely branched small erect shrub, with the slender branchlets clothed with dense short white and longer black gland-tipped hairs. Leaves under $\frac{1}{12}$ in. long, often 2 in the lower, always 3–4 in the upper whorls, oblong, rigid, dark green, glabrous, with the margins so much recurved that they leave the keel of the white back of the leaf visible. Flowers 3–4 together in copious terminal umbels; pedicels glandular, as long as the flowers. Calyx short, campanulate, with 4 deltoid segments. Corolla globose, under $\frac{1}{12}$ in. in diam., with four small deltoid teeth. Stamens 8, reaching to the tip of the corolla, with oblong brown anthers and short deltoid free filaments. Pistil twice as long as the corolla, with a large peltate stigma.—Central Madagascar, *Baron* 2129!

ANAGALLIS (§ JIRASEKIA) NUMMULARIFOLIA, n. sp.

Perennis, reptans, caule gracili elongato decumbente ramoso, foliis parvis sessilibus alternis orbicularibus, floribus axillaribus solitariis, pedicellis folium 2-3plo superantibus, calycis tubo brevissimo segmentis lanceolatis, corollæ rubellæ tubo brevissimo segmentis oblongis, staminibus basi brevissime connatis filamentis basi fimbriatis.

A perennial, with radicant slender trailing branched stems half a foot long. Leaves obscurely petioled, quite orbicular, $\frac{1}{8}$–$\frac{1}{6}$ in. broad, moderately firm in texture, green and glabrous on both surfaces, paler beneath. Pedicels $\frac{1}{4}$ in. long, cernuous in the fruiting stage. Calyx $\frac{1}{12}$ in. long; segments lanceolate. Corolla pale pink, $\frac{1}{6}$ in. long, cleft nearly to the base into 5 spreading oblong segments. Filaments rather shorter than the segments, united at the very base into a cup, and fimbriated at the base of the free portion; anthers minute, oblong, cream-coloured.—Central Madagascar, *Baron* 2148!

ANAGALLIS (§ JIRASEKIA) PEPLOIDES, n. sp.

Perennis, reptans, caule gracili brevi simplici vel furcato, foliis parvis sessilibus oblongis, floribus axillaribus pedicellis folium 2-3plo superantibus, calycis tubo brevissimo segmentis lanceolatis, corollæ rubellæ tubo campanulato segmentis oblongis, staminibus basi breviter connatis fimbriatis.

A trailing perennial, with entirely decumbent simple or forked radicant stems $1\frac{1}{2}$-2 in. long. Leaves close, opposite, sessile, erect, $\frac{1}{8}$–$\frac{1}{6}$ in. long, spathulately narrowed at the base, thick in texture, green and glabrous on both surfaces. Flowers few, on erect slender glabrous peduncles $\frac{1}{4}$ in. long. Calyx campanulate, $\frac{1}{12}$ in. long, cut down to the base into 5 lanceolate segments. Corolla $\frac{1}{4}$ in. long, pale pink, with a campanulate tube and 5 oblong segments twice as long as the tube. Stamens reaching nearly to the tip of the corolla, with minute oblong cream-coloured anthers and glabrous filaments united at the base in a short fimbriated tube.—Central Madagascar, *Baron* 2135! Both this and the last are near allies of *A. tenella*.

LYSIMACHIA (§ EPHEMERUM) PARVIFLORA, n. sp.

Glabra, caule simplici, foliis parvis subsessilibus lanceolatis sæpissime alternis raro oppositis vel oblongis, racemis elongatis angustis sursum densis deorsum laxis, pedicellis brevibus, bracteis lanceolatis persistentibus, calycis tubo subnullo segmentis lanceolatis, corollæ albæ tubo campanulato segmentis oblongis, staminibus liberis, fructu capsulari magnitudine pisi.

An erect perennial or biennial, glabrous in all its parts, with simple terete stems 2 ft. or more long. Leaves moderately firm in texture, green and glabrous on both surfaces, usually contiguous and alternate, 1–1½ in. long, ¼ in. broad at the middle, narrowed gradually to both ends, sometimes more distant and opposite or subopposite, sometimes oblong, ½ in. broad. Racemes single, terminal, at first dense at the top, finally lax throughout, 6–9 in. long. Pedicels erecto-patent, $\frac{1}{12}$–⅛ in. long. Bracts lanceolate, persistent, longer than the pedicels. Calyx campanulate, ⅙ in. long and broad, cut down to the base into 5 lanceolate segments. Corolla very little longer than the calyx, white, the 5 oblong obtuse segments twice as long as the tube. Stamens inserted at the throat of the tube, rather shorter than the segments. Capsule globose, ⅙ in. in diam.—Central Madagascar, *Baron* 654! 1816! A near ally of the Oriental *L. dubia* Ait. (*L. orientalis*, Lam.).

Mæsa trichophlebia, n. sp.

M. ramulis dense pilosis, foliis breviter petiolatis oblongis acutis serratis facie glabris dorso præsertim ad venas primarias brunneo-pilosis, racemis densis in paniculas parvas axillares aggregatis, rhachibus pilosis, pedicellis brevissimis, bracteis minutis deltoideis, fructu parvo globoso glabro apice libero dentibus 5 minutis deltoideo-cuspidatis coronato.

A tree, with densely pilose terete woody brown branchlets. Petiole ¼–⅓ in. long; blade 3–4 in. long, 1½ in. broad, rounded at the base, sharply serrated, moderately firm in texture, bright green and glabrous on the upper surface, pale green beneath and densely hairy on the arcuate-ascending 6–8-jugate main veins. Flowers in dense shortly peduncled axillary panicles about an inch long, with densely hairy branchlets; pedicels very short; bracts deltoid, as long as the pedicels. Drupe globose, glabrous, green, ⅛ in. long, free at the apex, crowned with 5 minute deltoid-cuspidate calyx-teeth. Style a quarter as long as the fruit, cylindrical; stigma peltate.—Central Madagascar, *Dr. Parker*! Native name "rafy." A near ally of the Tropical-African *M. lanceolata*, Forsk.

EMBELIA SARMENTOSA, n. sp.

Sarmentosa, glabra, ramulis brunneis lenticellatis, foliis breviter petiolatis oblanceolato-oblongis obtusis coriaceis nitidulis reticulato-venulosis, racemis axillaribus et terminalibus simplicibus vel parce paniculatis, pedicellis glabris patulis quam flos longioribus, bracteis minutis deltoideis, calycis glabri segmentis deltoideis, petalis oblongis quam calyx 2–3plo longioribus, staminibus inclusis.

A climbing shrub, glabrous in all its parts, with slender terete bright brown branchlets, rough with copious lenticels. Petiole $\frac{1}{8}$–$\frac{1}{6}$ in. long; blade $1\frac{1}{2}$–2 in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. broad, very obtuse, narrowed gradually from the middle to the base, rigid in texture, bright green and quite glabrous on both surfaces, with fine raised erecto-patent veins, connected by an arch just within the margin. Racemes lax, about an inch long, the end ones often slightly compound; pedicels $\frac{1}{8}$ in. long, with a very minute deltoid bract at the base, slender, glabrous. Calyx $\frac{1}{2}$ line long, with 5 deltoid segments. Petals green, with a white border dotted with black, obtuse. Stamens more than half as long as the petals; anthers orbicular. Fruit not seen.—Forest of Andrangaloaka, *Dr. Parker*!

EMBELIA NUMMULARIÆFOLIA, n. sp.

Arbuscula, erecta, ramosissima, ramulis breviter pilosis, foliis petiolatis parvis orbicularibus subcoriaceis utrinque viridibus glabris, racemis copiosis axillaribus et terminalibus simplicibus vel parce paniculatis, pedicellis pilosis flori æquilongis, calycis pilosi segmentis deltoideis, fructu minuto glabro.

A much-branched erect shrub, with slender terete straight woody branchlets clothed with dense short pubescence. Petiole $\frac{1}{6}$–$\frac{1}{4}$ in. long; blade $\frac{1}{3}$–$\frac{1}{2}$ in. long and broad, broadly rounded at both ends, firm in texture, green and glabrous on both surfaces, with fine inconspicuous immersed veins beneath. Racemes copious, simple from the axils of the leaves, sometimes slightly compound from the end of the branchlets, 1–$1\frac{1}{4}$ in. long in the final stage, with spreading pedicels not more than $\frac{1}{12}$ in. long, which, like the rhachis, are densely clothed with short brown pubescence. Bracts linear or lanceolate, pilose, shorter than the pedicels. Calyx pilose, $\frac{1}{3}$ line long. Corolla and stamens not seen. Drupe black, glabrous, globose, $\frac{1}{12}$ in. in diam., tipped with a persistent style half as long, with a peltate stigma. —Central Madagascar, *Baron* 1028!

EMBELIA VILLOSA, n. sp.

Arbuscula erecta, ramulis dense brunneo-villosis, foliis breviter petiolatis oblongis obtusis utrinque viridibus pubescentibus, racemis in paniculas amplas tripinnatas terminales aggregatis, pedicellis flori æquilongis, bracteis minutis lanceolatis, calycis pilosi minuti segmentis lanceolato-deltoideis, petalis ovato-oblongis quam calyx 2–3plo longioribus, staminibus inclusis, fructu globoso scabro.

A shrub with slender terete woody branchlets clothed with very dense short brown pubescence. Petiole $\frac{1}{4}$–$\frac{1}{3}$ in. long; blade 2–3 in. long, 1–1$\frac{1}{2}$ in. broad, rounded at both ends, moderately firm in texture, green and shortly pilose on both surfaces, with fine but distinct erecto-patent main veins. Flowers in an entirely terminal bipinnate deltoid panicle 3–4 in. long and broad, with densely pilose branchlets, the ultimate racemes $\frac{1}{2}$–1 in. long in the flowering stage. Pedicels patent, finally $\frac{1}{8}$ in. long, with a minute lanceolate pilose bract at the base. Calyx $\frac{1}{4}$ line long, densely pilose. Petals ovate-oblong, hairy, greenish, dotted with black. Anthers minute, orbicular. Fruit globose, $\frac{1}{12}$ in. in diam., tipped with a persistent style half as long as the drupe, with a peltate stigma.—Central Madagascar, *Baron* 467! 2160*a*! A near ally of the well-known *Embelia Ribes*, Burm.

EMBELIA CONCINNA, n. sp.

Sarmentosa, ramosissima, ramulis obscure pilosis, foliis petiolatis parvis obovatis obtusis emarginatis subcoriaceis utrinque glabris, racemis copiosis axillaribus et terminalibus simplicibus vel parce paniculatis, pedicellis subpatulis quam flos longioribus, bracteis minutis lanceolatis, calycis pilosi segmentis deltoideis, petalis oblongis quam calyx triplo longioribus, staminibus inclusis.

A much-branched sarmentose shrub, with slender shortly pilose flexuose rugose ultimate branchlets. Petiole $\frac{1}{8}$–$\frac{1}{6}$ in. long; blade $\frac{1}{2}$–$\frac{3}{4}$ in. long, $\frac{3}{8}$–$\frac{1}{2}$ in. broad, distinctly emarginate, moderately firm in texture, bright green above, dull green beneath, with fine indistinct immersed veins, without any visible black dots. Racemes very copious, axillary and terminal, the latter often slightly compound, $\frac{1}{2}$–1 in. long, with a slender shortly pilose axis; pedicels spreading, $\frac{1}{8}$ in. long; bracts minute, pilose, persistent. Calyx $\frac{1}{3}$ line long, cut down nearly to the base into 5 acute deltoid segments. Petals oblong, greenish, $\frac{1}{12}$ in. long. Stamens not more than half as long as the petals; anthers minute, orbicular. Fruit not seen.—Central Madagascar, *Baron*

1771! and a variety with longer but not broader leaves (1–1¼ in. long), *Baron* 1879! 2018!

ARDISIA FUSCO-PILOSA, n. sp.

Arbuscula ramulis dense breviter fusco-pilosis, foliis parvis petiolatis oblongis acutis glabris, umbellis axillaribus 3–4-floris, pedicellis brevibus dense pilosis, calycis pilosi segmentis ovatis, corollæ segmentis orbicularibus tubo æquilongis, antheris parvis ovatis filamento brevi plano, fructu depresso-globoso glabro magnitudine pisi.

A much-branched small tree, with slender woody terete sometimes flexuose branchlets clothed with dense short brown pubescence. Petiole ⅛–⅙ in.; blade 1–2 in. long, acute, deltoid at the base, ½–¾ in. broad at the middle, moderately firm in texture, green and glabrous on both surfaces, or hairy on the midrib beneath; the veins fine and inconspicuous. Umbels from the axils of many of the upper leaves; peduncle and pedicels densely pilose, the former ¼–½ in. long, the latter as long as or a little longer than the calyx. Calyx campanulate, ⅛ in. in diam.; tube very short; segments ovate, obtuse. Corolla ⅙ in. long; segments orbicular, obtuse, longer than the tube. Anthers not more than ½ line long. Fruit glabrous, depresso-globose, ⅙ in. in diam., with a very short style and peltate stigma.—Central Madagascar, *Baron* 1159! 1160! 1843!

ARDISIA NITIDULA, n. sp.

Arborea, glabra, foliis breviter petiolatis oblanceolato-oblongis obtusis subcoriaceis nitidulis copiose nigro-punctatis, floribus in racemos laxos simplices terminales vel axillares breviter pedunculatos dispositis, pedicellis patulis quam flos 2–3plo longioribus, calycis segmentis ovatis, corollæ segmentis ovatis tubo æquilongis, antheris minutis ovatis, fructu nigro glabro depresso-globoso.

An erect tree, glabrous in all its parts, with slender terete final branchlets. Petiole ¼ in. long; blade 2–3 in. long, ¾–1 in. broad, obtuse or subacute, narrowed gradually from the middle to the base, bright green, quite glabrous, with copious conspicuous black dots beneath and fine rather raised numerous erecto-patent main veins. Flowers in simple shortly peduncled terminal or axillary racemes an inch long; pedicels spreading or cernuous, ¼ in. long, sometimes ½ in. in the fruiting stage; bracts minute, deciduous. Calyx $\frac{1}{12}$ in. in diam. in flower, ½ lin. long; segments broad ovate, subobtuse. Corolla ⅙ in. long, greenish, copiously dotted with black. Anthers not more than ½ lin. long. Drupe hard, black, depresso-globose, glabrous, nearly $\frac{1}{4}$ in. in diam.; style very short; stigma peltate.—Central Madagascar, *Baron* 1215! 1261! 1265! 1266! A near ally of the Mauritian *A. Sieberi*, Baker.

ARDISIA BIPINNATA, n. sp.

Arborea, glabra, foliis oblanceolato-oblongis obtusis petiolatis subcoriaceis, floribus parvis in paniculas deltoideas bipinnatas pedunculatas axillares et terminales dispositis, ramulis secundariis racemosis, pedicellis quam flos longioribus, bracteis minutis lanceolatis, calycis segmentis orbicularibus, corollæ segmentis orbicularibus quam tubus longioribus, antheris minutis ovatis.

A tree or large shrub, glabrous in all its parts. Petiole $\frac{1}{2}$–$\frac{3}{4}$ in. long; blade 4–5 in. long, 1$\frac{1}{2}$–2 in. broad, obtuse, narrowed gradually from the middle to the base, firm in texture, green and glabrous on both surfaces, with fine immersed veins and no visible black dots. Panicle deltoid, 2–3 in. long, made up of racemes 1–2 in. long, the side ones spreading; pedicels $\frac{1}{12}$–$\frac{1}{8}$ in. long, spreading; bracts minute, lanceolate, persistent. Calyx glabrous, not more than $\frac{1}{2}$ lin. long; tube very short; segments orbicular. Corolla $\frac{1}{8}$ in. long; orbicular segments longer than the campanulate tube. Anthers not more than $\frac{1}{2}$ lin. long, with a short flat filament.—Central Madagascar, *Baron* 463! Habit and leaves of *A. laurifolia*, from which it differs by its larger flowers and bipinnate panicle with racemose final branches.

ARDISIA LAURIFOLIA, *Baker*.—Badula laurifolia, *Bojer*; *A. DC. Prod.* viii. 108.

Arborea, glabra, foliis breviter petiolatis oblanceolato-oblongis obtusis subcoriaceis glabris, floribus in paniculas amplas decompositas pedunculatas axillares et terminales dispositis, ramulis glabris, ultimis corymbosis, pedicellis brevibus, calycis segmentis orbicularibus, corollæ parvæ segmentis orbicularibus tubo campanulato æquilongis, antheris minutis ovatis.

A shrub or small tree, with stout brown final branchlets, glabrous in all its parts. Petiole $\frac{1}{2}$–$\frac{3}{4}$ in. long; blade 3–5 in. long, 1$\frac{1}{2}$–2 in. broad, very obtuse, narrowed gradually from the middle to the base, firm in texture, quite glabrous on both surfaces, with numerous fine erecto-patent main veins, the black dots not visible. Panicles decompound, 3–4-pinnate, deltoid, 3–4 in. long, on erect or cernuous peduncles 2–3 in. long from the axils of the upper leaves; final branchlets corymbose; pedicels $\frac{1}{8}$–$\frac{1}{6}$ in. long. Calyx broadly campanulate, glabrous,

½ lin. long ; tube very short ; segments orbicular, much imbricated. Corolla 1 lin. long ; segments orbicular. Anthers minute, ovate. Ovary globose ; style very short.—Province of Betamena, on the banks of streams, *Bojer* ! *Gerrard* ! This may be the briefly described *A. floribunda*, Roem. et Schultes, A. DC. Prod. viii. 139, non Wallich.

ONCOSTEMUM ARTHRITICUM, n. sp.

Arbuscula glabra ramis basi cite tuberosis, ramulis gracillimis, foliis breviter petiolatis parvis obovatis obtusis subcoriaceis, umbellis axillaribus paucifloris, pedicellis elongatis pilosis, calycis segmentis deltoideis, corollæ segmentis ovatis copiose nigro-punctatis, filamentis coalitis, antheris ex tubo stamineo distincte protrusis.

A small tree, with branches curiously suddenly tuberous at the base, the crowded branchlets slender, woody, subterete, bright brown. Leaves alternate, spaced along the branchlets ; petiole ⅛ in. long ; blade about an inch long, obtuse, narrowed gradually from the middle to the base, firm and rigid in texture, with fine side veins and copious minute black dots beneath Umbels 2–3-flowered, about as long as the leaves ; pedicels very slender, ¼–⅓ in. long, glandular-pubescent. Calyx about ½ lin. long ; segments deltoid, about as long as the tube. Corolla ⅛ in. long ; segments ovate, copiously dotted with black. Staminal tube campanulate, about as long as the calyx, the anthers protruding out of it.—Central Madagascar, *Baron* ! (not numbered). Mr. Baron has also found (1949) the original type species of this genus, *O. Commersonianum*, A. Juss., of which we had not previously any specimens at Kew.

ONCOSTEMUM PEDICELLATUM, n. sp.

Arbuscula glabra ramis crassis lignosis, foliis subsessilibus oblanceolatis obtusis coriaceis venis immersis, umbellis 2–4-floris pedunculis pedicellisque elongatis gracillimis glanduloso-pubescentibus, calycis segmentis deltoideis, corollæ segmentis ovatis, staminum tubo campanulato ore 5-dentato, stylo incluso, stigmate peltato.

A small tree with thick woody branchlets. Leaves crowded at the tips of the branchlets, 2–3 in. long, under an inch broad, obtuse, entire, narrowed gradually from the middle to the base, thick in texture, dull green and glabrous on both surfaces, only the midrib visible. Peduncles solitary or fascicled in the axils of the leaves, especially at the end of the branchlets ; umbels 2–4-flowered ; pedicels very slender, about ½ in. long, minutely glandular-pubescent, with minute lanceolate bracts at the base. Calyx under a line long, with a short tube and 5 deltoid segments. Corolla $\frac{1}{8}$ in. long, greenish white, copiously dotted with black. Tube of the stamens about as long as the calyx, with 5 deltoid teeth, an anther just protruding beyond each. Style short, with a peltate stigma.—Forest of Alamazaotra, *Baron* 1470! Mbatomanga, forming a dense bush on hill-sides at 4000 feet, *Dr. Meller*! We have it also from the herbarium of Justice Blackburn under the name (probably given by Bojer) of *Ardisia pedunculata.*

ONCOSTEMUM PHYLLANTHOIDES, n. sp.

O. ramulis gracillimis dense breviter brunneo-pilosis, foliis confertis distichis breviter petiolatis oblongo-lanceolatis acutis glabris subcoriaceis, umbellis axillaribus paucifloris, pedicellis gracillimis glanduloso-puberulis, calycis segmentis orbicularibus, corollæ segmentis ovatis, tubo stamineo urceolato apice dentato.

A much-branched shrub or small tree, with slender woody branchlets, clothed with dense short brown pubescence. Leaves close, alternate, spreading in one plane; petiole very short; blade $1\frac{1}{2}$–2 in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. broad, moderately firm in texture, dark green and glabrous on both surfaces, the side veins fine and immersed. Umbels axillary, 1–4-flowered, not longer than the leaves; pedicels very slender, $\frac{1}{4}$–$\frac{1}{3}$ in. long, conspicuously glandular-pubescent, furnished with minute persistent bracts at the base. Calyx $\frac{1}{2}$ lin. long. Corolla not seen well-developed. Stamens forming an urceolate cup $\frac{1}{8}$ in. long, with 5 deltoid teeth at the throat.—Central Madagascar, *Baron* 1963!

JASMINUM PUBERULUM, n. sp.

J. ramulis obscure puberulis, foliis oppositis unifoliolatis breviter petiolatis ovatis acutis glabris, floribus in umbellas 2–4-floras dispositis, pedicellis calyci subæquilongis, calycis dentibus 5–6 linearibus quam tubus campanulatus duplo brevioribus, corollæ segmentis lineari-oblongis 6–8 tubo cylindrico subæquilongis.

A shrub, with slender terete obscurely pubescent branchlets. Leaves opposite, shortly petioled, $1\frac{1}{2}$–2 in. long, rounded at the base, subcoriaceous, green and glabrous on both surfaces, with fine obscure immersed veins. Flowers 2–4, in terminal and axillary umbels; pedicels $\frac{1}{6}$ in. long; bracts linear. Calyx $\frac{1}{6}$ in. long, glabrous, the 5–6 linear teeth not more than half as long as the campanulate tube. Corolla apparently white, with a glabrous cylindrical tube $\frac{1}{2}$–$\frac{5}{8}$ in. long and 6–8 obtuse linear-oblong segments about as long as the tube.—Central Madagascar, *Baron* 2064! Mr. Baron has refound *J. Kitchingii*, Baker (1139).

CARISSA DENSIFLORA, n. sp.

Arborea, glabra, spinis pungentibus simplicibus armata, foliis brevissime petiolatis oblongis acutis coriaceis venis immersis occultis, floribus in cymas densas terminales et laterales dispositis, pedicellis quam calyx longioribus, calycis tubo brevissimo, segmentis ovatis, corollæ segmentis ovatis quam tubus cylindricus duplo brevioribus.

An erect shrub or tree, glabrous in all its parts, with the branchlets thickened at the nodes. Spines pungent, simple, cylindrical, above ½ in. long. Leaves about 2 in. long, acute, deltoid at the base, green on both surfaces, shining above, all the veins except the midrib fine and hidden. Cymes many-flowered, copious, dense, subsessile, terminal and axillary; pedicels $\frac{1}{12}$–$\frac{1}{6}$ in. long. Calyx under $\frac{1}{12}$ in. long, with a very short tube and 5 imbricated ovate acute segments. Corolla with a cylindrical tube ¼ in. long and 5 ovate segments half as long as the tube. Anthers ½ lin. long, sessile at the hairy throat of the corolla-tube. Fruit not seen.—Central Madagascar, *Baron* 709!

CARISSA CRYPTOPHLEBIA, n. sp.

Arborea, glabra, inermis, foliis sessilibus oblongis obtusis coriaceis venis immersis occultis, floribus in cymas densas multifloras breviter pedunculatas dispositis, pedicellis brevibus, calycis campanulati dentibus deltoideis tubo æquilongis, corollæ segmentis oblongis quam tubus duplo brevioribus, antheris minutis oblongo-lanceolatis.

An erect shrub, glabrous in all its parts, with terete greenish woody branchlets, without any spines. Leaves 2–3 in. long, 1–1½ in. broad, obtuse, broadly rounded at the base, subcoriaceous, green and glabrous on both surfaces, with all the veins except the midrib fine and quite immersed. Flowers in dense shortly peduncled terminal cymes; pedicels $\frac{1}{12}$–$\frac{1}{8}$ in. long. Calyx under a line long; segments deltoid. Corolla under ½ in. long, the cylindrical tube hairy inside, especially at the throat. Anthers ½ line long, sessile at the throat of the corolla-tube. Fruit not seen.—Central Madagascar, *Baron*, 1790! Allied to the Indian *C. macrophylla*, Wallich.

VINCA (§ LOCHNERA) TRICHOPHYLLA, n. sp.

V. ramulis tetragonis, foliis sessilibus membranaceis oblongis acutis subtiliter pilosis, floribus axillaribus solitariis pedicellatis, calycis segmentis setaceis, corollæ tubo cylindrico segmentis oblique obovatis rubro tinctis, folliculis cylindricis.

A shrub, with slender square glabrous stems. Stipules cut down to the base into setaceous segments. Leaves in distant decussate pairs, ascending, acute, rounded at the base, 2–3 in. long, finely hairy on both surfaces, especially beneath. Flowers solitary in the axils of the leaves, on ascending pedicels $\frac{1}{4}$–$\frac{1}{3}$ in. long. Calyx cut down to the base into 5 linear-setaceous segments $\frac{1}{3}$ in. long. Corolla with a greenish cylindrical tube an inch long and 5 oblique obovate segments less than half as long as the tube. Anthers ovate, $\frac{1}{12}$ in. long, sessile at the glabrous throat of the corolla-tube. Follicles 2 in. long, slender, cylindrical, arcuate, marked with close fine vertical ribs.—East coast of Madagascar, *Baron* 1591! Gathered previously by Pervillé 323! 522! A near ally of the well-known *V. rosea*, L.

TABERNÆMONTANA SESSILIFOLIA, n. sp.

Glabra, foliis sessilibus oblongis acutis subcoriaceis glabris venis primariis 9–10-jugis, cymis 6–12-floris longe pedunculatis, pedicellis erectis quam calyx longioribus, calycis segmentis ovatis obtusis tubo æquilongis, corollæ segmentis oblongis quam tubus vix duplo brevioribus, folliculis oblongis curvatis ad apicem angustatis.

A shrub, glabrous in all its parts, with terete woody branchlets. Leaves quite sessile, acute, entire, rounded at the base, 4–5 in. long, $1\frac{1}{2}$–2 in. broad at the middle, green and glabrous on both surfaces, with 9–10 pairs of ascending distinct parallel primary veins. Flowers in dense cymes from the axils of upper leaves, with erect peduncles $1\frac{1}{2}$–2 in. long; pedicels $\frac{1}{4}$–$\frac{1}{3}$ in. long, not bracteated. Calyx $\frac{1}{12}$ in. in diam., with 5 ovate obtuse segments. Corolla white, with a cylindrical tube $\frac{1}{2}$–$\frac{5}{8}$ in. long, constricted at the top and a limb $\frac{3}{4}$–$\frac{7}{8}$ in. in diam. Follicles oblique oblong, curved, $1\frac{1}{2}$ in. long, $\frac{1}{2}$ in. in diam., narrowed to the point.—Central Madagascar, *Baron*, 446! 1783!

BUDDLEIA FUSCA, n. sp.

Arborea, ramosissima, ramulis teretibus obscure incanis, foliis breviter petiolatis parvis oblongis integris obtusis subcoriaceis facie obscure incanis dorso dense persistenter albido-incanis venulis exsculptis, racemis terminalibus congestis, pedicellis brevissimis, calycis albido-incani tubo campanulato dentibus deltoideis, corollæ tubo cylindrico recto albido-incano quam calyx duplo longiore segmentis orbicularibus patulis.

A very much branched erect tree or shrub, with slender woody obscurely pilose branchlets. Stipules very minute; leaves firm and thick in texture, ½–1 in. long, deltoid at the base, entire, dull green and obscurely pilose above, covered with a dense coating of persistent brownish-white tomentum beneath, the veins and veinlets conspicuously raised. Flowers in copious capitate congested terminal racemes about ½ in. long, with small cymes from the axils of the top leaves; pedicels very short, densely pilose; bracts minute, lanceolate. Calyx ⅛ in. long, densely canescent; teeth 4, deltoid, half as long as the campanulate tube. Corolla with a densely canescent cylindrical tube ¼ in. long and 4 small orbicular spreading yellowish-brown lobes. Anthers oblong, sessile near the top of the corolla-tube. Capsule small, oblong, pilose.—Central Madagascar, *Baron* 1830! A near ally of the Cape *B. auriculata*, Benth.

BUDDLEIA AXILLARIS, *Willd. in Roem. et Schultes, Syst.* iii. *Mant.* 97.

Fruticosa, ramulis 4-angulis, stipulis parvis foliaceis orbicularibus persistentibus, foliis petiolatis oblongis acuminatis denticulatis membranaceis utrinque viridibus glabris, racemis densis patulis subsessilibus axillaribus sæpissime simplicibus, pedicellis calyci æquilongis, calcyis tenuiter incani tubo campanulato dentibus deltoideis, corollæ tubo recto obscure incano segmentis 4 orbicularibus, staminibus sessilibus, fructu oblongo.

A shrub, with distinctly 4-angled long simple branches. Stipules small, foliaceous, persistent, orbicular. Leaves oblong, membranous, 3–4 in. long, 1½ in. broad, denticulate, rounded at the base, green and glabrous on both surfaces. Flowers in copious dense nearly sessile usually simple racemes 1–1½ in. long from the axils of the leaves; rhachis and pedicels thinly canescent; bracts small, lanceolate. Calyx $\frac{1}{12}$ in. long, thinly canescent. Corolla with a thinly canescent straight cylindrical tube ⅓ in. long and 4 small orbicular pale-coloured segments. Stamens sessile near the top of the corolla-tube. Capsule oblong, twice as long as the calyx.—Between Tankay and the east coast, *Baron* 1481! and a variety with larger leaves, cordate at the base and thinly coated with white tomentum beneath, *Baron* 1980! This very distinct species has only been characterized very imperfectly. There is a closely allied species in Johanna island (*B. comorensis*, Baker, MSS.), lately refound by Hildebrandt (1666), which differs by its large stipules, copiously compound racemes, and densely white canescent calyx and corolla-tube.

GÆRTNERA MACROSTIPULA, n. sp.

Glabra, stipulis magnis scariosis persistentibus truncatis, foliis magnis petiolatis obovato-oblongis cuspidatis subcoriaceis, floribus dense cymoso-paniculatis, pedicellis nullis vel brevissimis, bracteis lanceolatis persistentibus, calycis dentibus lanceolatis tubo campanulato æquilongis, corollæ segmentis lineari-oblongis tubum calyci æquilongum duplo superantibus.

A shrub, with stout branchlets, glabrous in all its parts. Stipules dark brown, scariose, sheathing, persistent, truncate, 1–1½ in. long. Petiole ½–1 in. long; blade 6–8 in. long, 2–3 in. broad, obtuse, with a cusp, narrowed gradually from the middle to the base, moderately firm in texture, green and glabrous on both surfaces, with 10–12 pairs of parallel distinct arcuate ascending main veins. Flowers very numerous, in a dense corymbose panicle 3–4 in. long and broad, with pubescent branches; central flowers of the cymes sessile; side ones shortly pedicellate; bracts lanceolate, persistent, ¼–⅓ in. long. Calyx ¼ in. long, pilose, the 5 lanceolate teeth equalling the campanulate tube. Corolla with a tube as long as the calyx, and 5 linear-oblong segments. Fruit unknown. Style as long as the corolla-tube.—Central Madagascar, *Baron* 1922! *Gerrard* 54! and the same or a near ally from Analamazoatra, 2000–4000 feet, gathered in August 1862 by Dr. Meller.

GÆRTNERA PHYLLOSEPALA, n. sp.

G. ramulis pilosis, stipulis magnis persistentibus, foliis brevissime petiolatis oblongis acutis subcoriaceis facie glabris dorso pilosis, floribus dense cymoso-paniculatis, pedicellis nullis vel brevissimis, bracteis lanceolatis persistentibus, calycis segmentis magnis lanceolatis quam tubus pilosus 3–4plo longioribus, corollæ segmentis oblongis quam tubus subcylindricus 3–4plo brevioribus.

A shrub or tree with densely pilose moderately stout branchlets. Stipules scariose, sheathing, truncate, ½ in. long. Petiole ⅛ in. long, densely pilose; blade 3–4 in. long, 1–1½ in. broad at the middle, acuminate, rounded at the base, green and glabrous on the upper surface, pilose especially on the raised arcuate ascending 8–10-jugate main veins beneath. Flowers numerous, in a dense corymbose panicle 3-4 in. long and broad, with pilose branchlets; terminal flowers of the cymes quite sessile. Bracts lanceolate, persistent, ⅓ in. long. Calyx-segments ¼–⅓ in. long. Corolla with a pilose tube ½ in. long, widening a little towards the top; segments spreading, obtuse, ⅙ in. long. Stamens just protruded from the summit of the corolla-tube. Fruit unknown. —Central Madagascar, *Baron* 1920!

GÆRTNERA SPHÆROCARPA, n. sp.

Fruticosa, glabra, ramulis 4-angulatis, stipulis parvis deciduis, foliis brevissime petiolatis obovato-oblongis cuspidatis utrinque viridibus glabris, floribus dense cymoso-paniculatis, calycis parvi dentibus deltoideis, fructu globoso magnitudine pisi.

A shrub, glabrous in all its parts, with long straight simple 4-angled woody branchlets. Stipules $\frac{1}{4}$ inch long, brown, membranous, deeply cleft, deciduous. Petiole very short; blade 3–4 in. long, 1–1$\frac{1}{2}$ in. broad above the middle, obtuse, with a small cusp, moderately firm in texture, green and glabrous on both surfaces, with about six pairs of distinct erecto-patent parallel main veins. Flowers in a dense terminal corymbose panicle about 3 in. long and broad; pedicels always very short. Calyx $\frac{1}{8}$ in. long, with 5 small deltoid segments. Corolla not seen. Fruit black, globose, $\frac{1}{6}$ in. in diam.—Central Madagascar, *Baron* 1233! 1243! Mr. Baron's 299 and 300, from the Tanala forests, is near this, but probably distinct. The leaves are much larger and more oblong (reaching 6 in. long. by 3 in. broad) with different veining. We have it in fruit only. Mr. Baron has again gathered *G. obovata*, Baker in Trimen's Journ. 1882, p. 218 (Nos. 1252, 1260, 1967); and Dr. Parker has sent it from the forest of Andrangaloaka, with a note that it is a tree 30–40 feet in height.

GÆRTNERA MACROBOTRYS, n. sp.

Fruticosa, glabra, ramulis crassis 4-angulatis, stipulis magnis oblongis persistentibus, foliis breviter petiolatis magnis oblongis cuspidatis subcoriaceis utrinque viridibus glabris, floribus dense cymoso-paniculatis, pedicellis brevibus, calycis parvi dentibus deltoideis, fructu oblongo.

A shrub, with thick glabrous 4-angled branchlets. Stipules an inch long, oblong, persistent, interpetiolar, firm in texture. Petiole flattened, $\frac{1}{2}$ in. long; blade oblong, reaching a length of 9–10 and a breadth of 4 inches, rounded at both ends, cuspidate, firm in texture, green and glabrous on both surfaces, with 10–12 pairs of distinctly raised parallel arcuate ascending main veins. Flowers in a dense corymbose panicle 6–9 in. long, 3–4 in. broad; central flowers of the cymes sessile; side ones with short pedicels. Calyx $\frac{1}{8}$ in. long and broad, with 5 small round or truncate teeth.

Corolla not seen. Fruit oblong, glabrous, $\frac{1}{3}$ in. long.—Central Madagascar, *Baron* 1945!

GÆRTNERA ARENARIA, n. sp.

Fruticosa, ramulis crassiusculis glabris, foliis brevissime petiolatis oblongis vel obovato-oblongis acutis subcoriaceis utrinque viridibus glabris, floribus in paniculas amplas ramulis albido-incanis laxifloris dichotome cymosis, cymarum lateralibus distincte pedicellatis, bracteis parvis lanceolatis, calycis tubo campanulato dentibus deltoideis, fructu oblongo.

A shrub, with moderately stout subterete glabrous woody branchlets. Leaves 4–6 in. long, $1\frac{1}{2}$–2 in. broad at the middle, acute, deltoid at the base, firm in texture, green and glabrous on both surfaces. Flowers in a lax deltoid panicle half a foot long and broad; branches, branchlets, and calyx coated with whitish tomentum; main branchlets patent; ultimate branchlets few-flowered dichotomous cymes, with the terminal flower in the fork sessile, the side ones with pedicels $\frac{1}{8}$–$\frac{1}{6}$ in. long, subtended at the base by small lanceolate bracts. Calyx $\frac{1}{8}$ in. long, with a campanulate tube and 5 deltoid teeth. Corolla not seen. Fruit oblong, glabrous, $\frac{1}{3}$ in. long.—Sands near the sea, Tranomaro near Tamatave, *Dr. Meller* July 1862! Two other Madagascar species of this genus (*G. inflexa* and *G. cardiocarpa*) are described by Dr. Baillon in Adansonia, vol. xii. pp. 237, 238.

EXACUM BULBILLIFERUM, n. sp.

Suffruticosum, glabrum, caule bulbillifero ad apicem foliato, foliis breviter petiolatis oblongo-spathulatis acutis membranaceis, floribus in cymas paucifloras laxas terminales dispositis, pedicellis flori æquilongis, calycis segmentis ovatis acutis dorso late alatis, corollæ segmentis rubellis ovatis quam tubus longioribus, antheris oblongis filamento filiformi, stylo elongato.

A shrubby perennial, glabrous in all its parts, with terete greenish woody slender stems bearing several globose brown bulbilli. Leaves in opposite pairs up to the top of the branches, shortly petioled, membranous, 1–$1\frac{1}{2}$ in. long, triplinerved above the base. Flowers 2–3 in a terminal cyme, on slender pedicels $\frac{1}{4}$–$\frac{1}{3}$ in. long. Calyx $\frac{1}{3}$ in. long, cut down nearly to the base into 4 ovate segments broadly winged on the back. Corolla twice as long as the calyx; segments reddish, obovate, twice as long as the tube. Stamens with an oblong anther $\frac{1}{8}$ in. long, exceeding the filiform filament. Ovary ampullæform, sessile, narrowed into a long filiform style.—Central Madagascar, *Baron* 1701!

EXACUM ROSULATUM, n. sp.

Annuum, erectum, glabrum, caule ramoso, foliis plerisque basalibus rosulatis obovatis, caulinis paucijugis valde reductis, floribus in cymas plurimas paucifloras densas paniculatas dispositis, pedicellis brevissimis, calycis segmentis oblongis obtusis exalatis, corollæ segmentis oblongis quam tubus 3–4plo longioribus, antheris parvis oblongis filamento elongato.

An erect annual, glabrous in all its parts, with slender stems under a foot long, branched low down. Leaves at the flowering time several in a basal rosette, obovate, membranous, glabrous, an inch long, narrowed from the middle to the base, and about three pairs on the stem sessile and much smaller. Flowers in several distant cymes on erecto-patent peduncles, very few in each, with very short pedicels; bracts small, thick, oblong. Calyx campanulate, $\frac{1}{12}$ in. long, cut down nearly to the base into five oblong foliaceous segments, which are not at all winged on the back. Corolla bright yellow, $\frac{1}{4}$ in. long, with a short tube and 5 oblong segments. Stamens inserted in the tube, reaching halfway up the corolla, with small oblong versatile anthers and filiform filaments.—Central Madagascar, *Baron* 1886!

EXACUM SPATHULATUM, n. sp.

Annuum, erectum, glabrum, caule simplici, foliis 5–6-jugis oppositis orbicularibus sessilibus, floribus paucis in cymas densas terminales aggregatis, pedicellis brevibus, bracteis oblongis, sepalis 5 oblongis exalatis, corollæ segmentis oblongo-spathulatis tubum campanulatum triplo superantibus, antheris magnis lineari-oblongis filamento brevissimo.

An erect annual, glabrous in all its parts, with slender simple stems $\frac{1}{2}$–1 foot long. Leaves in about half a dozen pairs, orbicular, sessile, membranous, the lower near together, $\frac{1}{2}$–$\frac{3}{4}$ in. long, narrowed to the base or rounded, the upper distant and much smaller. Flowers 3–6 in dense simple or slightly compound terminal cymes; pedicels very short; bracts small, ovate or oblong. Calyx campanulate, $\frac{1}{8}$–$\frac{1}{6}$ in. long, cut to the base into five oblong green segments with a white margin, not at all winged on the back. Corolla bright yellow, $\frac{1}{3}$–$\frac{1}{2}$ in. long, with a campanulate tube and 5 oblong spathulate segments. Stamens inserted in the corolla-tube, with a linear-oblong anther $\frac{1}{12}$ in. long and very short filament. Ovary globose, with a curved style $\frac{1}{6}$ in. long.—Central Madagascar, *Baron* 1857! This and the last are yellow-flowered annual species, with the habit of *Exacum quinquenervium* and *Sebæa brachyphylla* and *S. Bojeri*.

Tournefortia puberula, n. sp.

T. ramulis apice brunneo-puberulis, foliis petiolatis oblongis acutis membranaceis utrinque viridibus glabris, floribus minutis in paniculam terminalem ramulis patulis scorpioideis dispositis, pedicellis nullis vel brevissimis, calycis segmentis 5 lanceolatis, fructu oblongo glabro.

A shrub, with slender angled woody branchlets clothed with thin pubescence towards the top. Petiole ½–¾ in. long; blade 3–4 in. long, 1¼–1½ in. broad, rounded at the base, acute, thin in texture, glabrous on both surfaces, very dark green above, with 5–6 pairs of main veins anastomosing by arches within the margin. Flowers in a terminal panicle, the cymes in the flowering stage an inch long; branchlets densely silky; flowers sessile or nearly so. Calyx ½ lin. long, with a very short tube and 5 lanceolate teeth. Corolla with a cylindrical silky tube twice as long as the calyx and 5 minute orbicular segments. Fruit black, glabrous, ⅙ in. long.—Central Madagascar, *Baron* 1957! A near ally of the American *T. lævigata*, Lam.

Cynoglossum monophlebium, n. sp.

C. caule hispido, foliis sessilibus oblanceolatis obtusis utrinque viridibus hispidis, cymis racemiformibus deorsum laxis, pedicellis brevissimis, calycis hispidi segmentis deltoideis, floribus parvis, carpellis fructiferis dense breviter echinatis.

Stems erect, copiously branched, clothed with ascending whitish bristly hairs. Leaves alternate, thin in texture, sessile, erecto-patent, obtuse, 2–3 in. long, ¼–⅓ in. broad, narrowed gradually from the middle to the base, green and thinly bristly on both surfaces, only the midrib visible. Terminal cyme 3–4 in. long, only the lowest flowers bracteated by small leaves, their ascending pedicels scarcely longer than the calyx. Flower-calyx densely pilose, not more than ½ lin. long. Expanded limb of the corolla ⅛ in. in diam. Fruit-carpels densely shortly echinate.—Central Madagascar, *Baron* 1871! and a monster with fasciated stems three inches broad, *Baron* 2009! A near ally of *C. Rochelia*, A. DC.

Cynoglossum cernuum, n. sp.

C. caule hispido, foliis lanceolatis sessilibus integris membranaceis utrinque viridibus hispidis, cymis racemiformibus deorsum laxis, pedicellis inferioribus cernuis quam calyx 3–4plo longioribus, calycis dense pilosi tubo brevi segmentis ovatis, floribus pro genere magnis, carpellis tuberculatis haud echinatis.

An erect branched (biennial?) herb, with slender stems thinly clothed with spreading whitish bristly hairs. Leaves membranous, sessile, erecto-patent, acute, entire, 1½–2 in. long, green and thinly clothed with adpressed white bristly hairs on both sides. Cymes dense at the top, very lax downwards; only the very lowest flowers bracteoled by a small leaf at the base, with cernuous pedicels ¼–⅓ in. long. Flower-calyx ⅛ in. long, clothed with dense adpressed white bristly hairs. Corolla bright blue, with a limb nearly ¼ in. in diam; lobes orbicular, as long as the tube. Immature carpels not distinctly echinate.—Central Madagascar, *Baron* 2033!

CYNOGLOSSUM DISCOLOR, n. sp.

C. caule gracili pilis adpressis tenuiter vestito, foliis membranaceis facie viridibus parce hispidis dorso albo-incanis acutis integris inferioribus oblongis superioribus lanceolatis, cymis racemiformibus deorsum laxis, pedicellis erecto-patentibus, calycis dense pilosi tubo brevi segmentis deltoideis, floribus magnitudine mediocri.

An erect (biennial?) herb, with slender branched erect stems 2–3 feet long, thinly clothed with adpressed whitish hairs. Leaves alternate, thin in texture, narrowed from the middle to both ends, entire, green and obscurely hispid above, matted with persistent white silvery tomentum beneath; lower shortly petioled, oblong, ½–¾ in. broad, 1–1½ in. long; upper smaller, lanceolate. Cymes with clustered upper, distant lower flowers, only the very lowest minutely bracteated; lower pedicels twice as long as the flower-calyx. Flower-calyx ⅛ in. long, densely pilose; segments deltoid, acute. Expanded limb of corolla ⅙ in. in diam.; lobes orbicular, equalling the tube. Fruit not seen.—Central Madagascar, *Baron* 1828!

CONVOLVULUS OLIGODONTUS, n. sp.

Annuus, ramosissimus, ramulis obscure pilosis, foliis breviter petiolatis lanceolato-hastatis integris vel deorsum parce dentatis utrinque viridibus glabris, floribus 1–2nis axillaribus, bracteolis oblongis adpressis, sepalis oblongis cuspidatis, corolla alba quam calyx triplo longiore, staminibus inclusis antheris minutis, fructu globoso.

A much-branched annual, with long spreading slender obscurely pilose stems. Leaves alternate, shortly petioled, the upper about ½ in. long, mucronate, with deltoid basal lobes, moderately firm in texture, green and glabrous on both sides, the lower broader and shorter, the very lowest suborbicular. Flowers 1–2 on simple or forked peduncles from the axils of the leaves; bracts minute, lanceolate. Calyx campanulate, $\frac{1}{6}$ in. long in the flowering stage, with two persistent oblong cuspidate bracteoles adpressed to it; sepals oblong cuspidate, imbricated. Corolla white, $\frac{1}{2}$ in. long. Stamens included, with long filiform filaments and minute ovate anthers. Ovary globose, pilose at the tip, with a long filiform style and 2 linear-subulate ascending stigmas. Capsule globose, $\frac{1}{6}$ in. in diam., enclosed in the persistent calyx.—Central Madagascar, between Imerina and the east coast, *Baron* 1385! 1406! A near ally of the Cape *C. hastatus*, Thunb.

CARDIOCHLAMYS MADAGASCARIENSIS, *Oliver in Hook. Ic.* t. 1403. This is an interesting new genus of Convolvulaceæ, allied to *Porana*, of which a figure and diagnosis have been published in Hooker's 'Icones.' We had an incomplete specimen long ago from Dr. Lyall; and now Dr. Parker and Mr. Baron (700 & 879) have sent complete material.

SOLANUM APOCYNIFOLIUM, n. sp.

Fruticosum, ramulis inermibus dense pilosis, foliis petiolatis oblongis acutis integris subcoriaceis utrinque glabris, cymis pluribus laxis in paniculam terminalem aggregatis, calycis glabri tubo campanulato dentibus parvis semiorbicularibus, corollæ tubo brevi segmentis oblongis.

An erect shrub, with long slender unarmed wand-like branchlets, densely clothed with drab-brown stellate hairs. Leaves alternate, shortly petioled, with usually two small oblong leaves in their axil; blade $1\frac{1}{2}$–2 in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. broad, acute, narrowed to the base, firm in texture, green and glabrous on both surfaces, with 6–7 pairs of distinct but fine main veins connected by distinct arches a space within the margin. Cymes several, forming a lax terminal panicle above the leaves except the lowest; rhachis and peduncle densely pilose; pedicels $\frac{1}{8}$–$\frac{1}{6}$ in. long, glabrous. Calyx $\frac{1}{8}$ in. in diam., with a campanulate tube and 5 small half-orbicular teeth. Corolla seen only in the bud stage.—Central Madagascar, *Baron* 1767! Allied to *S. Benthami* and *aureum*, Dunal in DC. Prodr. xiii. 101.

SOLANUM FLAGELLIFERUM, n. sp.

S. caule fruticoso, ramulis gracillimis elongatis stellato-pilosis aculeis copiosis uncinatis latis armatis, foliis petiolatis ovatis acutis integris basi inæqualibus facie viridibus tenuiter pilosis dorso albido-incanis, floribus solitariis axillaribus pedunculatis, calycis pilosi segmentis lineari-subulatis tubo æquilongis, corollæ pilosæ segmentis deltoideis.

A shrub, with very slender sarmentose branches, clothed with stellate pubescence and armed with copious broad-based brown prickles $\frac{1}{8}$–$\frac{1}{6}$ in. long. Leaves alternate, distinctly petioled, $1\frac{1}{2}$–2 in. long, $\frac{3}{4}$–1 in. broad, very unequal at the base, thin in texture, green and rough with stellate hairs above, densely matted with brownish-white stellate pubescence beneath. Flowers solitary, from the axils of the leaves on slender ascending pedicels about $\frac{1}{2}$ in. long. Calyx $\frac{1}{4}$ in. long, with a densely pilose cuneate tube and linear-subulate teeth. Corolla $\frac{3}{4}$ in. long, pilose on the outside, with 4 segments as long as the tube. Anthers $\frac{1}{4}$ in. long, with very short filaments. Fruit unknown.—Forest of Alamazaotra, *Baron* 1482! A near ally of the East-Asian *S. trilobatum*, Linn.; Dunal in DC. Prodr. xiii. 287.

HALLERIA TETRAGONA, n. sp.

Fruticosa, glabra, ramulis tetragonis, foliis oppositis breviter petiolatis parvis ovatis serratis subcoriaceis, floribus axillaribus 1–2nis pedicellis gracillimis, calycis late campanulati dentibus semiorbicularibus, corollæ rubræ infundibularis dentibus brevissimis quadratis, staminibus exsertis.

A much-branched erect shrub, glabrous in all its parts, with acutely tetragonous slender tough green stems, distinctly constricted at each node. Leaves opposite, shortly petioled, ascending, ovate, about $\frac{1}{2}$ in. long, thick and rigid in texture, brightly green, minutely serrated. Flowers from the axils of the leaves, on very slender simple or forked pedicels about $\frac{1}{2}$ in. long. Calyx $\frac{1}{8}$ in. long, with 5 half-orbicular segments shorter than the tube. Corolla bright red, $\frac{3}{4}$ in. long, nearly oblong in the upper part, narrowed to a cylindrical base. Anthers 4, minute, orbicular, exserted. Style very slender, $\frac{3}{4}$ in. long.—Central Madagascar, gathered long ago by Bojer, and now rediscovered by Baron 1880! This is the Madagascar species alluded to in Gen. Plant. vol. ii. p. 936. It is a very near ally of the Cape *H. elliptica*, L.

ALECTRA PEDICULARIOIDES, n. sp.

A. caule brevi erecto ramosissimo, ramulis pilosis, foliis parvis sessilibus oppositis ovatis, pedicellis solitariis axillaribus elongatis ascendentibus, calycis pilosi tubo oblongo 10-costato dentibus deltoideis, corollæ tubo infundibulari segmentis oblongis, antheris parvis oblongis dorso dense barbatis basi mucronatis, fructu magno orbiculari nigro glabro.

A parasitic perennial herb, turning entirely black when dried, with cæspitose erect much-branched slender finely pilose stems not more than 3–4 inches long. Leaves in opposite pairs, ovate, ascending, crenate, not more than $\frac{1}{4}$ in. long, pilose beneath. Flowers solitary, from the axils of the leaves all down the stem, on slender ascending pedicels, the lower 1–1$\frac{1}{2}$ in. long, the upper growing gradually shorter. Flower-calyx $\frac{1}{3}$ in. long, with an oblong tube with 10 pilose ribs and 5 small deltoid teeth. Corolla twice as long as the calyx, shortly pilose, with lobes $\frac{1}{4}$ in. long. Stamens just reaching to the throat of the corolla-tube; anthers 2-celled, oblong, caudate, densely hairy on the back. Fruit globose, $\frac{1}{2}$ in. in diam., black, glabrous, splitting the persistent calyx. Seeds very numerous, angled, clavate, pale brown, glabrous, $\frac{1}{12}$ in. long.—Central Madagascar, *Baron* 1847!

TETRASPIDIUM, genus novum Scrophulariacearum tribus Gerardiearum. (Tab. XXV.)

Calyx brevis, pilosus, tubo campanulato, dentibus 5 lanceolato-deltoideis quam tubus duplo brevioribus. Corolla tubo curvato infundibulari, segmentis 5 parvis orbicularibus, posticis æstivatione interioribus. Stamina 4, didynama, prope basin corollæ inserta, in tubo inclusa, filamentis filiformibus, antheris pendulis orbicularibus peltatis basifixis; antherarum loculus alter perfectus orbicularis muticus, alter abortivus vel minimus. Ovarium sessile, ampullæforme, 2-loculare, ovulis in loculo pluribus; stylus elongatus filiformis, stigmate integro clavato. Fructus ignotus.—Herba parasitica Madagascariensis siccitate nigrescens, foliis pluribus parvis sessilibus lanceolatis, inferioribus oppositis, superioribus alternis, floribus multis laxe racemosis purpurascentibus foliis reductis bracteatis.

T. LAXIFLORUM, *Baker*. (Plate XXV. figs. 1–5.)

A parasitic herb, turning entirely black in drying, with simple erect finely pilose stems 2–3 feet long (inflorescence included). Leaves numerous, sessile, lanceolate, entire, adpressed to the stem, 1–1$\frac{1}{2}$ in. long, 1-nerved, slightly pilose, the lower in decussate pairs, the upper alternate. Flowers in very lax racemes 6–9 in. long; pedicels short, ascending, with a reduced lanceolate leaf at the base. Calyx $\frac{1}{6}$ in. long and broad. Corolla $\frac{1}{2}$ in. long, pilose externally, turning black like the rest of the plant, the segments from one third to one fourth the length of the tube. Stamens all four inserted near the base of the corolla; filaments scabrous, rather flattened towards the base; anthers basifixed, pendulous, orbicular, $\frac{1}{2}$ line long, the second cell entirely absent or very small and rudimentary. Ovary ampullæform; style filiform, $\frac{1}{4}$ in. long, decurved at the clavate stigmatose tip.—Central Madagascar, *Baron* 1855! Allied to *Alectra* and *Harveya*, from both of which it differs by having the second cell of all the four anthers almost completely aborted. I believe that Mr. C. B. Clarke showed me the same plant some time ago in the collection of Dr. Rutenberg.

UTRICULARIA PARKERI, n. sp.

Humilis, cæspitosa, foliis nullis vel minutis petiolatis lanceolatis, caule gracillimo 2–3-pollicari 1–4-floro, pedicellis brevissimis, bracteis minutis geminis lanceolatis, floribus purpureis, calycis segmentis ovatis, corollæ labio supremo brevi lato, labio inferiore orbiculato quam calyx triplo longiore, calcari cylindrico labio inferiori æquilongo.

Densely cæspitose, with very slender erect 1–4-flowered stems not more than 2–3 in. long. Leaves none in any of our specimens; but minute petioled lanceolate leaves are represented in Dr. Parker's drawing made from the living plant. Flowers purple. Pedicels very short, ascending, clasped by a pair of minute lanceolate basifixed bracts. Calyx not more than $\frac{1}{2}$ line long. Upper lip of the corolla very short, erect; lower orbicular, $\frac{1}{8}$ in. long, with a cylindrical spur nearly or quite as long.—Central Madagascar, *Lyall* 283! *Baron* 931! 1048! Forest of Andrangaloaka, *Dr. Parker*! with a drawing made from the living plant. A near ally of *U. capensis*, Spreng.

UTRICULARIA LINGULATA, n. sp.

Humilis, aphylla, caule gracillimo 2–3-pollicari unifloro, floribus luteis, bracteis geminis minutis, calycis segmentis ovatis, corollæ labio supremo lingulato quam calyx triplo longiore, labio inferiore obovato-unguiculato ad basin laminæ saccato, calcari infundibulari calyci subæquilongo.

A leafless species, with very slender erect one-flowered stems not more than 2–3 in. long. Bract ovate-lanceolate, basifixed, placed a short distance below the flower, enclosing a minute bracteole. Calyx of two ovate green segments $\frac{1}{8}$ in. long. Corolla yellow, with a lingulate upper lip $\frac{1}{3}$ in. long and a rather longer lower lip, with a deflexed obovate lamina with an orbicular saccate palate at the base. Spur scarcely longer than the calyx. —Forest of Andrangaloaka, *Dr. Parker*!

UTRICULARIA SPARTEA, n. sp.

Limosa, cæspitosa, aphylla, caulibus strictis erectis pedalibus ad sesquipedalibus, racemis laxis 6–8-floris, floribus purpurascentibus, pedicellis brevibus, bracteis geminis lanceolatis, calycis segmentis ovatis, corollæ labio supremo parvo erecto, inferiore magno orbiculari, calcari cylindrico labio inferiori æquilongo.

Stems densely cæspitose, slender, erect, a foot or more long, without any leaves at the flowering time. Flowers in a lax raceme 1–2 in. long; pedicels erecto-patent, not more than $\frac{1}{12}$ in. long, clasped by a pair of minute lanceolate basifixed bracts at the base. Calyx of two ovate green segments $\frac{1}{8}$ in. long. Corolla purple, with a small upper lip; lower lip suborbicular, $\frac{1}{3}$ in. long; spur cylindrical, as long as the lower lip. Capsule globose, as long as the calyx.—Central Madagascar, *Baron* 1740! 1861! 2133! A near ally of the Angolan *U. linarioides*, Welw.; Oliver in Journ. Linn. Soc. ix. 151.

MONACHOCHLAMYS, genus novum Acanthacearum tribus Thunbergiearum. (Tab. XXVI.)

Flores umbellati; umbellæ solitariæ in bracteola orbiculari spathacea ad basin unilateraliter fissa inclusæ. Calyx minimus, patellæformis, ore obscure multidentato. Corollæ tubus basi cylindricus, sursum infundibularis; segmenta 5, parva, oblonga vel obovata, æstivatione contorta. Stamina 4 didynama, medio corollæ tubo inserta; filamenta brevia; antheræ apiculatæ, loculis 2 oblongis parallelis, pendulæ. Ovarium ovoideum, uniloculare, ovulis 2 collateralibus erectis; stylus elongatus, filiformis, stigmate parvo capitato. Fructus ignotus.—Frutex Madagascariensis sarmentosa, copiose ramosa, foliis oppositis petiolatis oblongis integris emarginatis, floribus parvis umbellatis, umbellis solitariis vel 2–3 in racemum superpositis.

M. FLAGELLARIS, *Baker*. (Plate XXVI. figs. 1-6.)

A much-branched sarmentose shrub, with slender glabrous green quadrangular woody branchlets. Leaves opposite, distinctly petioled, oblong, obtuse, emarginate, $1\frac{1}{2}$–3 in. long, moderately firm in texture, green and glabrous on both surfaces. Flowers 4-6 in an umbel on pedicels $\frac{1}{4}$–$\frac{1}{3}$ in. long, the umbels solitary on short peduncles from the axils of the leaves or 2–3 superposed in a raceme, the lower bracteated by a pair of much reduced leaves. Bracteole persistent, spathaceous, green, glabrous, $\frac{1}{4}$ in. long, slit down to the base on one side. Calyx very short, $\frac{1}{12}$ in. in diam. Corolla about $\frac{1}{2}$ in. long, the segments not more than $\frac{1}{8}$ in. long. Stamens and style not protruded from the corolla-tube.—Central Madagascar, *Baron* 1743! 1789! Only two genera of this well-marked tribe of Acanthaceæ are already known, *Mendoncia* and *Thunbergia*, from both of which this is abundantly distinct, both by characters and habit.

THUNBERGIA (§ EUTHUNBERGIA) PLATYPHYLLA, n. sp.

Herbacea, caulibus erectis simplicibus, foliis sessilibus cordatis late

ovatis obtusis integris facie scabris dorso glabris, floribus solitariis axillaribus longe pedunculatis, bracteis magnis ovatis foliaceis, calycis minuti tubo campanulato dentibus linearibus circiter 10, corolla magna purpurea tubo late infundibulari segmentis patulis orbicularibus.

A perennial herb, with slender erect simple stems about a foot long. Leaves in five or six distant pairs, sessile, cordate-ovate, 1½–2 in. long, 1¼–1½ in. broad, moderately firm in texture, green and glabrous on both surfaces. Flowers solitary from the axils of the upper leaves, on ascending peduncles 1–3 in. long. Bracteoles ovate, an inch long, foliaceous in texture, pilose on the edge. Calyx ⅛ in. long. Corolla 1¼ in. long, with a tube cylindrical at the base, broadly funnel-shaped above it; expanded limb 1¼–1½ in. in diam. Stamens inserted low down in the corolla-tube. Stigma with two divaricating flattened forks.—Central Madagascar, *Baron* 2001!

ECHINACANTHUS MADAGASCARIENSIS, n. sp.

Perennis, ramulis glabris tetragonis, foliis petiolatis oblongis acutis glabris membranaceis serratis, floribus paucis laxe cymosis, pedicellis pilosis, bracteis parvis lanceolatis, calycis segmentis longissimis anguste linearibus, corollæ luteæ quam calyx vix longioris tubo late infundibulari segmentis parvis orbicularibus.

A perennial herb, with slender square green glabrous tetragonous stems distinctly constricted above the nodes. Leaf-pairs 1–1½ in. apart; petiole ½–¾ in. long; blade about 2 in. long, rounded at the base, serrulate, membranous, dark green and glabrous on both sides. Flowers in lax cymes; pedicels slender, pilose, about ½ in. long, with a pair of small lanceolate bracts a space from the calyx. Calyx ⅝–¾ in. long, with a very short tube and 5 linear setaceous pilose segments. Corolla yellow, with a funnel-shaped tube ½ in. in diam. at the throat and 5 orbicular spreading segments ¼ in. broad. Stamens inserted low down in the tube, reaching nearly or quite to its throat; filaments slender, ¼–⅓ in. long; anthers 4, oblong, ⅛ in. long, each with a double spur at the base.—Between Tankay and the east coast, *Baron* 1531! This has entirely the habit of *Mimulopsis*, from which it differs only by the four bicalcarate anthers.

FORSYTHIOPSIS, genus novum Acanthacearum tribus Ruelliearum. (Tab. XXVII.)

Bracteæ et bracteolæ nullæ vel minutissimæ. Calyx parvus, campanulatus, fere ad basin 5-partitus, segmentis lanceolatis. Corolla tubo

cylindrico, segmentis 5 oblongis subæqualibus obtusis quam tubus longioribus æstivatione contortis. Stamina 4, didynama, ad medium corollæ tubi inserta, longiora perfecta, filamentis brevibus, antheris oblongis bilocularibus decurrentibus loculis parallelis muticis, 2 breviora rudimentaria, antheris minutis cassis. Ovarium sessile, ovoideum, ovulis in loculo paucis superpositis; stylus elongatus, filiformis, stigmate parvo clavato obscure emarginato. Fructus ignotus.—Frutex erectus Madagascariensis, ramosissimus, glaber, ramulis crassis lignosis, foliis post anthesin perfectis oppositis sessilibus obovatis obtusis integris, floribus fasciculatis axillaribus pedicellatis.

F. Baroni, *Baker*. (Plate XXVII. figs. 1–6.)

A much-branched erect shrub, glabrous in all its parts, with thick woody compressed ascending branchlets with grey bark, distinctly thickened at the nodes, and the alternate internodes compressed on different sides. Leaves opposite (or fascicled at the nodes through the suppression of a branchlet), obovate, obtuse, entire, moderately firm in texture, green and glabrous on both surfaces, narrowed gradually from the middle to the base, not fully developed till after the flowering time, under an inch long when the flowers are expanded. Flowers geminate or fascicled at the nodes and tips of the branchlets; pedicels at most $\frac{1}{4}$–$\frac{1}{3}$ in. long, sometimes bractless, sometimes with a minute lanceolate bract a short distance from the base. Calyx $\frac{1}{8}$ in. long, cut down nearly to the base into 5 acute lanceolate segments. Corolla whitish, with a cylindrical tube $\frac{1}{4}$–$\frac{1}{3}$ in. long and an obscurely bilabiate limb of five subequal obtuse segments nearly $\frac{1}{2}$ in. long. Longer stamens and style exserted out of the corolla-tube, but falling far short of the tip of the limb.—Central Madagascar, *Baron* 1737! Allied to *Ruellia*, from which it differs by its short cylindrical corolla-tube, long limb, and two very imperfect stamens.

Mimulopsis diffusa, n. sp.

Humilis, diffusa, ramulis gracillimis glabris, foliis parvis petiolatis oblongis vel lanceolatis subintegris membranaceis, floribus parce laxe paniculatis, pedicellis elongatis, bracteis minutis lanceolatis, calycis segmentis lineari-setaceis glanduloso-puberulis, corollæ tubo late infundibulari calyci æquilongo segmentis patulis orbicularibus, staminibus quam tubus brevioribus.

A perennial herb, with long very slender trailing hairy stems with short ascending branches. Petiole $\frac{1}{4}$–$\frac{1}{3}$ in. long; blade at most 1–1$\frac{1}{2}$ in. long, $\frac{1}{4}$–$\frac{1}{3}$ in. broad, acute, rounded at the base, membranous, green and glabrous on both surfaces. Flowers in very lax terminal deltoid panicles, the lower branches with reduced leaves at the base; pedicels very slender, densely glanduloso-pilose. Calyx $\frac{1}{2}$ in. long, cut down to the base into linear setaceous glandular segments. Corolla bright yellow, $\frac{3}{4}$ in. long, the orbicular segments from half to one third as long as the tube, which is $\frac{1}{3}$ in. in diam. at the throat. Stamens inserted near the base of the corolla-tube, not reaching nearly to the top, only one cell of either of the two upper anthers spurred.—Forest of Andrangaloaka, *Dr. Parker*!

MIMULOPSIS LANCEOLATA, n. sp.

Perennis, ramosissima, ramulis glabris tetragonis, foliis petiolatis lanceolatis integris membranaceis glabris, floribus laxe cymosis, pedicellis glanduloso-pubescentibus, bracteis parvis lanceolatis, calycis tubo brevissimo segmentis lineari-setaceis, corollæ tubo late infundibulari calyci æquilongo, segmentis 5 patulis orbicularibus.

A much-branched erect perennial herb about 2 feet high, with slender tetragonous green glabrous branches. Leaves shortly petioled, 2–3 in. long, $\frac{1}{4}$–$\frac{1}{2}$ in. broad, rounded at the base, membranous, green and glabrous on both surfaces. Flowers in lax terminal and axillary cymes; pedicels very slender, densely glanduloso-pilose, with a pair of small bracts a space from the calyx. Calyx $\frac{1}{2}$ in. long, with long linear setaceous pubescent segments free nearly to the base. Corolla $\frac{3}{4}$ in. long, bright yellow, with orbicular segments $\frac{1}{4}$ in. broad. Stamens inserted low down in the corolla-tube, with long filaments, only one cell of the anther of the two longer stamens caudate. Capsule with two lanceolate horny valves $\frac{3}{4}$ in. long.—Grit and clay soil, Mbatomanga, alt. 4000 feet, *Dr. Meller*! Between Tankay and the east coast, *Baron* 1506! Forest of Alamazaotra, *Baron* 1613!

STROBILANTHES MADAGASCARIENSIS, n. sp.

Fruticosa, ramulis tetragonis pilosis, foliis petiolatis oblongis acuminatis membranaceis utrinque viridibus pilosis, floribus laxe spicato-paniculatis, bracteolis 2 lanceolatis pilosis quam calyx longioribus, calycis pilosi quinquepartiti segmentis lanceolatis, corollæ tubo late infundibulari quam calyx triplo longiore segmentis orbicularibus, genitalibus inclusis.

A much-branched erect shrub, 3–6 feet high, with slender pilose tetragonous branchlets. Leaves long-petioled, 3–4 in. long, 1–1$\frac{1}{2}$ in. broad at the middle, acuminate, narrowed gradually to the base, thin in texture, green and pilose on both surfaces. Flowers solitary and in short spikes from the axils of the leaves all down the branches, nearly sessile, each subtended by a pair of lanceolate foliaceous bracteoles adpressed to the calyx. Flower-calyx $\frac{1}{4}$–$\frac{1}{3}$ in. long, pilose, cut down to the base into 5 equal linear segments. Corolla purple, with a curved tube an inch long, $\frac{1}{2}$–$\frac{5}{8}$ in. in diam. at the throat, and 5 semiorbicular segments $\frac{1}{4}$ in. long and broad. Anthers 4, oblong, muticous; filaments inserted about the middle of the corolla-tube; longer $\frac{1}{4}$ in., shorter $\frac{1}{8}$ in. long. Style overtopping the stamens, with 2 unequal stigmatose forks. Capsule clavate, $\frac{1}{2}$ in. long, 4-seeded.—Forests of the province of Imerina, *Parker*! *Baron* 1075! Forest of Alamazaotra, *Baron* 1405 (flowers longer; bracts and calyx more densely pilose). Adds this large characteristically Asiatic genus to the island-flora.

ISOGLOSSA JUSTICIOIDES, n. sp.

Perennis, ramulis gracillimis tetragonis obscure pilosis, foliis petiolatis oblongis membranaceis utrinque viridibus glabris, floribus parvis laxe spicato-paniculatis, bracteis minutis lanceolatis, calycis tubo brevissimo segmentis lanceolatis, corollæ tubo cylindrico, limbo brevi, staminibus inclusis, antherarum loculis oblongis conspicue disjunctis.

An erect perennial herb or undershrub, glabrous in all its parts, with very slender tetragonous branches. Leaves distant, opposite, conspicuously petioled, $1\frac{1}{2}$–2 in. long, acute, rounded at the base, thin in texture, green and glabrous on both surfaces. Flowers in short rather lax peduncled spikes from the axils of the upper leaves; bracts lanceolate, acute, glabrous, shorter than the calyx. Calyx $\frac{1}{12}$ in. long, glabrous, with a very short tube and 5 lanceolate acute teeth. Corolla $\frac{1}{4}$ in. long, with a pilose cylindrical tube and a bilabiate lip not more than $\frac{1}{12}$ in. long. Stamens 2, inserted about the middle of the corolla-tube, with filiform filaments $\frac{1}{12}$ in. long and two oblong muticous cells, one much higher than the other. Stigma bifid, exserted from the corolla-tube—Central Madagascar, *Baron* 1216! Only differs from *Justicia* by its stamens. Mr. C. B. Clarke has kindly helped me in the determination of this and the other Acanthaceæ of the collection.

JUSTICIA (§ ANISOSTACHYA) RHODOPTERA, n. sp.

Perennis, ramulis gracillimis breviter pilosis, foliis petiolatis oblongis acutis integris membranaceis glabris, floribus in spicas axillares et terminales

dispositis, singulis bracteolis 2 parvis lanceolatis et extus bractea magna obovata rubella obtusa suffultis, calycis quinquepartiti segmentis linearibus pilosis, corollæ tubo cylindrico, limbo bilabiato quam calyx paulo breviore, genitalibus inclusis.

An erect perennial herb or undershrub, with slender green shortly pilose branches. Leaves opposite, distant, distinctly petioled, 1½–2 in. long, under an inch broad at the middle, narrowed gradually to both ends, thin in texture, green and glabrous on both surfaces. Flowers in short peduncled spikes from the axils of the upper leaves, each flower subtended by a pair of small lanceolate bracteoles, and on the outside by an obovate reddish obtuse membranous bract as long as the flower. Calyx $\frac{1}{6}$ in. long, cut down to the base into lanceolate acuminate pilose segments. Corolla $\frac{1}{3}$ in. long, with a cylindrical tube as long as the calyx and a bilabiate limb, of which the posticous lip is cleft into three oblong segments. Anthers oblong, $\frac{1}{2}$ lin. long, rather longer than the filaments, the two cells but slightly unequal. Capsule as long as the calyx, with lanceolate valves, two seeds in each.—Central Madagascar, *Baron* 1791 ! A near ally of *J. haplostachya* and *J. Commersoni.*

JUSTICIA (§ ANISOSTACHYA) CHLOROPTERA, n. sp.

Perennis, ramulis gracillimis breviter pilosis, foliis petiolatis oblongis acutis integris membranaceis glabris, floribus copiose spicato-paniculatis, singulis bracteolis 2 parvis lanceolatis et extus bractea magna obcordata viridula spathulata suffultis, calycis quinquefidi segmentis lineari-setaceis, capsula clavata calyci æquilonga.

A near ally of the last species, with precisely similar general habit and leaves. Flowers in branched peduncled spikes from the axils of the upper leaves, forming a broad obtuse terminal decompound panicle, each flower subtended by a pair of small lanceolate bracteoles adpressed to the calyx and an obovate-spathulate green membranous bract on the outside $\frac{1}{4}$–$\frac{1}{3}$ in. long, conspicuously emarginate at the top. Calyx nearly as long as the bract, cut down to the base into 5 linear-setaceous segments. Corolla not seen. Capsule clavate, as long as the calyx, splitting to the base into two recurving lanceolate valves with a couple of seeds in each.—Central Madagascar, *Baron* 2175 !

HYPOESTES CALAMINTHOIDES, n. sp.

Herbacea, caulibus decumbentibus breviter pilosis, foliis parvis petiolatis ovatis integris pilosis, floribus ad axillas foliorum verticillatis, pedicellis

brevissimis, involucri uniflori bracteis 4 lanceolatis pilosis, calyce minuto, corollæ tubo cylindrico quam involucrum duplo longiore, limbo brevissimo.

A perennial herb, with short very slender radicant shortly pilose stems. Leaves opposite, distinctly petioled, ovate, entire, obtuse, ½–¾ in. long, shortly pilose on both surfaces, dark green above, much paler beneath. Flowers 2–6, in whorls in the axils of the leaves, on very short pedicels. Involucre cylindrical, ¼ in. long; bracts lanceolate, acute, densely pilose, the two inner generally shorter, narrower and less acute than the two outer. Calyx not more than ½ line long; segments membranous, lanceolate, ciliated. Corolla white, with a slender cylindrical tube ½ in. long and a limb of 4 oblong segments not more than $\frac{1}{12}$ in. long. Anthers just exserted from the corolla-tube.—Central Madagascar, *Baron* 863! *Parker*! Native name *Sarinanamalupo*. A near ally of *H. serpens*, R. Br., and *H. ascendens*, Nees.

HYPOESTES COMORENSIS, n. sp.

Fruticosa, ramulis tetragonis glabris, foliis longe petiolatis oblongis integris acutis utrinque viridibus glabris, floribus copiose laxe spicato-paniculatis, involucro unifloro bracteis 4 lanceolatis rigidulis glabris subobtusis, calyce quam involucrum paulo breviore, corollæ albæ tubo infundibulari quam involucrum 3–4plo longiore, limbo quam tubus quadruplo breviore.

An erect shrub, 6–8 feet high, with slender tetragonous glabrous green branchlets. Petiole sometimes 2–2½ in. long; blade half a foot long, 2½–3 in. broad at the middle, very acute, deltoid at the base, thin in texture, green and glabrous on both surfaces. Flowers in a lax oblong terminal panicle half a foot long, the branches lax secund spikes with a square green glabrous axis, the lower very compound, subtended by large leaves at the base. Involucre ¼ in. long, cylindrical; bracts green, glabrous, firm in texture. Calyx ⅙ in. long. Corolla white, with a pilose tube an inch long, gradually widening from the top of the involucre to a throat ⅙ in. in diam.; limb ¼ in. long; the posticous lip entire and oblong, the anticous with three short lobes. Stamens and style nearly as long as the lip.—Woods of Johanna Island, ascending to 3000 feet above sea-level, *Dr. Meller*! *Sir John Kirk*! *Bewsher*!

HYPOESTES CORYMBOSA, n. sp.

Fruticosa, ramulis breviter pilosis, foliis petiolatis oblongis acutis integris utrinque glabris, floribus in paniculas terminales ramulis pilosis corymbosis dispositis, pedicellis quam involucrum longioribus, involucro unifloro parvo bracteis 4 lanceolatis dense pilosis, calyce quam involucrum duplo breviore,

corollæ albæ tubo cylindrico involucrum duplo superante, limbo quam tubus duplo breviore segmentis oblongis.

An erect shrub, with slender green finely pilose branchlets. Leaves in distant pairs, shortly petioled, 2–3 in. long, an inch broad, deltoid at the base, very thin in texture, bright green on both surfaces, obscurely hairy only on the midrib and main veins beneath. Flowers in a moderately dense terminal panicle 2–3 in. long, with large leaves at the base of the main branches; pedicels slender, pilose, ascending, $\frac{1}{8}$–$\frac{1}{6}$ in. long, not bracteated. Involucre $\frac{1}{6}$ in. long, of 4 lanceolate densely pilose bracts. Calyx $\frac{1}{12}$ in. long. Corolla white, with a pilose cylindrical tube $\frac{1}{3}$ in. long and 4 oblong segments.—Central Madagascar, *Baron* 1791!

HYPOESTES SECUNDIFLORA, n. sp.

Fruticosa, ramulis gracillimis subtiliter pilosis, foliis petiolatis oblongis integris membranaceis glabris, floribus in spicas laxas secundas paniculatas dispositis, involucro unifloro bracteis 4 pilosis lanceolatis, calyce quam involucrum duplo breviore, corollæ tubo infundibulari quam involucrum duplo longiore, corollæ limbo quam tubus duplo breviore fauce maculata.

An erect shrub, with very slender shortly pilose branchlets. Leaves opposite, distinctly petioled, $1\frac{1}{2}$–2 in. long, under an inch broad, obtuse, narrowed to the base, very thin in texture, green and glabrous on both surfaces. Flowers in lax ascending secund spikes $1\frac{1}{2}$–2 in. long from the axils of the upper leaves, with a very slender pilose axis. Involucre $\frac{1}{6}$ in. long, of 4 equal lanceolate acute pilose bracts of moderately firm texture. Calyx-segments linear. Corolla whitish, with a narrowly funnel-shaped rather curved tube $\frac{1}{3}$ in. long and a limb $\frac{1}{6}$ in. long, the posticous lip entire and oblong, and the anticous with 3 orbicular lobes, spotted with purple at the throat. Stamens and stigma shorter than the lips.—Central Madagascar, in forests of the province of Imerina, *Baron* 1322! A near ally of *H. sanguinolenta*, Hook. in Bot. Mag. t. 5511, as are also *H. brachiata*, *H. corymbosa*, and *H. comorensis*.

HYPOESTES BRACHIATA, n. sp.

Herbacea, perennis, ramulis gracillimis brevissime pilosis, foliis petiolatis lanceolatis acutis integris membranaceis parce pilosis, floribus spicato-paniculatis, involucro unifloro bracteis 4 lanceolatis pilosis, calyce quam involucrum triplo breviore, corollæ rubellæ tubo cylindrico quam involucrum sesqui longiore, limbo quam tubus duplo breviore segmentis oblongis.

A branched erect perennial, with very slender finely pilose stems. Leaves shortly petioled, 1–$1\frac{1}{2}$ in. long, $\frac{1}{4}$–$\frac{1}{3}$ in. broad, membranous, bright green and distinctly hispid on the upper surface, pale green and obscurely hispid on the main veins beneath. Flowers in 2–3 lax secund ascending spikes 1–2 in. long from the axils of the upper leaves, with a very slender pilose axis. Involucre $\frac{1}{6}$ in. long, of 4 lanceolate acute pilose subequal bracts. Calyx $\frac{1}{2}$ line long; segments lanceolate, free down to the base. Corolla pink, with a cylindrical tube a little longer than the involucre and a limb $\frac{1}{8}$ in. long, with 4 oblong segments. Stamens and style reaching nearly to the tip of the limb.—Forest of Andrangaloaka, near rivulets, *Dr. Parker*!

HYPOESTES LONICEROIDES, n. sp.

Suffruticosa, ramosissima, glabra, foliis petiolatis oblongis acutis, floribus laxe spicato-paniculatis, involucro unifloro bracteis 4 lanceolatis rigidulis glabris acuminatis, calyce quam involucrum duplo breviore, corollæ albidæ tubo quam involucrum triplo longiore, labio superiore lingulato, inferiore fauce pulchre rubro maculato lobo centrali deltoideo lateralibus lingulatis.

A much-branched erect shrub, 5–6 feet high, with slender glabrous woody green tetragonous branchlets. Leaves distant, distinctly petioled, 2–3 in. long, narrowed to both ends, moderately firm in texture, green and glabrous on both surfaces. Flowers in lax equilateral spikes 1–2 in. long, with reduced leaves at the base of the spike, forming a very lax terminal panicle. Involucre sessile, not bracteated, $\frac{1}{3}$ in. long, of 4 lanceolate acuminate bracteoles of firm texture. Calyx $\frac{1}{6}$ in. long; segments lanceolate. Corolla with a curved tube above an inch long, $\frac{1}{6}$ in. in diam. at the throat; upper lip lingulate, $\frac{1}{4}$–$\frac{1}{3}$ in. long; lower as long, marked with red spots at the throat, with a central end and two small lingulate side segments. Filaments $\frac{3}{4}$ in. long, the anthers protruding from the tube.—Forest of Andrangaloaka, *Dr. Parker*! A fine species, allied to *H. pulchra*, Nees, and *H. rodriguesiana*, Balf. fil.

LIPPIA (§ ZAPANIA) OLIGOPHYLLA, n. sp.

Annua, caule simplici erecto tetragono piloso, foliis paucijugis petiolatis oblongis crenatis hispidis, floribus in glomerulos globosos pedunculatos axillares aggregatis, bracteis paucis exterioribus foliaceis, reliquis late cuneatis truncatis membranaceis, pedicellis brevissimis, calyce brevi hispido, corollæ tubo infundibulari bracteæ æquilongo segmentis minutis orbicularibus patulis.

An erect annual, with simple tetragonous slender erect pilose stems $\frac{1}{2}$–1 ft. long. Leaves 5–6 distant pairs, distinctly petioled, oblong, 1–1½ in. long, narrowed from the middle to the base, moderately thick and firm in texture, green and hispid on both surfaces. Flowers in globose heads ¼ in. in diam., on peduncles at the end of the stem and from the axils of most of the leaves; outer bracts ovate, foliaceous; inner cuneate, membranous, truncate, pilose, ⅛ in. broad, $\frac{1}{12}$ in. long. Flowers under ⅛ in. long. Pedicel very short. Calyx ½ lin. long, densely hispid. Corolla with a funnel-shaped tube reaching to the top of the bract, and minute spreading orbicular segments. Genitalia just protruded from the corolla-tube.—Central Madagascar, *Baron* 953! Allied to *L. sessiliflora* and *L. geminata*, but an unbranched annual.

VITEX IBARENSIS, n. sp.

Erecta, glabra, foliis simplicibus petiolatis oblongis subcoriaceis obtusis vel acutis utrinque viridibus glabris, cymis congestis sessilibus axillaribus paucifloris, pedicellis brevissimis, calycis tubo infundibulari campanulato dentibus parvis deltoideo-cuspidatis, corollæ tubo elongato subcylindrico piloso rubello segmentis brevissimis, genitalibus exsertis.

An erect shrub, with slender woody glabrous branchlets. Leaves simple, opposite; petiole ½ in. long; blade 3–4 in. long, 1½ in. broad, acute or obtuse, deltoid at the base, firm in texture, green and glabrous on both surfaces, the 5–6-jugate arcuate ascending main veins prominent beneath. Cymes 3–4-flowered, congested in the axils of the upper leaves; pedicels very short. Calyx ⅙ in. long, clothed with stellate brown pubescence; teeth very small. Corolla nearly an inch long, the tube ⅙ in. in diam. at the throat, the segments very small, semiorbicular. Style protruded ¼–⅓ in. beyond the corolla-limb.—Ibara country, *Langley Kitching*! A near ally of the next species.

VITEX PHILLYREÆFOLIA, n. sp.

Erecta, ramosissima, ramulis apice villosis, foliis simplicibus petiolatis oblongis obtusis subcoriaceis utrinque viridibus glabris, floribus axillaribus solitariis, pedicellis brevissimis, calycis pilosi tubo infundibulari dentibus parvis deltoideis, corollæ tubo elongato subcylindrico piloso, limbo parvo.

A much-branched erect shrub, with slender woody branchlets, densely villose towards the top. Leaves opposite; petiole very short, villose; blade 1–1½ in. long, under an inch broad, very obtuse, often emarginate at the apex, deltoid at the base, firm in texture, green and glabrous on both surfaces, the side veins fine and immersed. Flowers solitary, nearly sessile in the axils of the upper leaves. Calyx ¼ in. long, shaggy with brown silky hairs, the teeth not more than a quarter as long as the tube. Corolla an inch long, reddish, densely pilose, the limb $\frac{1}{6}$ in. long, the tube $\frac{1}{6}$ in. in diam. at the throat. Stamens and style not protruded beyond the limb.—Between Tankay and the east coast, *Baron* 1446! Allied to *V. Bojeri*, Schauer.

VITEX MELLERI, n. sp.

V. ramulis lignosis brunneo-puberulis, foliis longe petiolatis 5-foliolatis, foliolis obovato-oblongis obtusis coriaceis emarginatis glabris omnibus distincte petiolulatis, cymis paucifloris corymbosis axillaribus pedunculatis, pedicellis quam calyx longioribus, calyce puberulo campanulato truncato, corollæ tubo subcylindrico villoso, limbo brevissimo, genitalibus exsertis.

A shrub, with woody branchlets, clothed with short brown pubescence. Leaves opposite, with a petiole $2\frac{1}{2}$–3 in. long; leaflets 5, with petiolules $\frac{1}{4}$–$\frac{1}{3}$ in. long; blade 2–3 in. long, an inch broad, thick and rigid in texture, very obtuse, distinctly emarginate, deltoid at the base, green and glabrous on both surfaces, with 6–8-jugate arcuate ascending distinct main veins. Cymes 10–12-flowered, much shorter than the petiole; branches clothed with short brown pubescence. Calyx $\frac{1}{6}$ in. long and broad. Corolla $\frac{3}{4}$ in. long, with a curved subcylindrical tube $\frac{1}{6}$ in. in diam. at the throat, densely clothed with yellow-brown silky hairs; segments very short, semiorbicular. Style and stamens protruded $\frac{1}{6}$ in. beyond the corolla-limb; anthers minute, orbicular.—Andovorant, between Tamatave and Antananarivo, *Dr. Meller*! A very near ally of *V. Chrysomallum*, Steud.

VITEX PACHYCLADA, n. sp.

Erecta, ramosissima, ramulis dense pilosis, foliis petiolatis trifoliolatis, foliolis obovatis obtusis crassis coriaceis petiolulatis facie glabris dorso dense pilosis, cymis paucifloris congestis axillaribus, pedicellis dense pilosis, calyce cyathiformi brunneo-piloso dentibus parvis late deltoideis, fructu nitido globoso brunneo pericarpio rugoso.

A much-branched erect shrub, with thick woody branchlets, clothed with short dense brown hairs. Petiole 1–$1\frac{1}{2}$ in. long; end leaflet with a petiolule $\frac{1}{4}$–$\frac{1}{3}$ in. long; those of the side leaflets shorter; blade $1\frac{1}{2}$–2 in. long, 1–$1\frac{1}{2}$ in. broad, very obtuse, thick and coriaceous in texture, densely clothed on the underside with bright brown pubescence. Cymes 6–8-flowered, in the axils of the leaves, with very short densely silky peduncles and pedicels. Fruit-calyx $\frac{1}{4}$ in. long, densely clothed with the same short bright brown silky hairs; teeth minute, much broader than long. Corolla not seen. Drupe bright brown, globose, twice as long as the calyx, the pericarp much wrinkled.—Forest at Amparimpotsy, *Baron* 1471 ! A near ally of the last species.

CLERODENDRON PYRIFOLIUM, n. sp.

Arboreum, erectum, glabrum, foliis oppositis petiolatis ovatis acutis integris utrinque viridibus, cymis in paniculas corymbosas terminales aggregatis, pedicellis quam calyx longioribus, calyce parvo cyathiformi ore subtruncato, corollæ tubo elongato cylindrico, limbo parvo segmentis orbicularibus, genitalibus longe exsertis.

An erect tree, glabrous in all its parts, with pale woody terete slender lenticellate branchlets. Petiole $\frac{1}{2}$–$\frac{3}{4}$ in. long; blade $1\frac{1}{2}$–2 in. long, 1–$1\frac{1}{4}$ in. broad, acute, entire, deltoid at the base, moderately firm in texture, green and glabrous on both surfaces, with fine immersed arcuate main veins. Flowers in copious flat-topped peduncled cymes from the end of the branchlets and axils of the upper leaves; pedicels erect, $\frac{1}{8}$–$\frac{1}{4}$ in. long. Calyx cyathiform, glabrous, $\frac{1}{8}$ in. long, the throat nearly truncate, patelliform and accrescent in the fruit-stage. Corolla with a glabrous cylindrical tube $\frac{1}{3}$ in. long and a limb not more than $\frac{1}{6}$ in. in diam. Style twice as long as the corolla-tube. Fruit obovoid, glabrous, blackish, $\frac{1}{3}$ in. long.—Central Madagascar, about 50 miles from the east coast, *Baron* 1445 !

CLERODENDRON RAMOSISSIMUM, n. sp.

Erectum, ramosissimum, ramulis gracilibus pilosis, foliis parvis petiolatis obovatis integris subcoriaceis glabris, floribus in cymas densas paniculatas terminales ramulis dense hispidis dispositis, calycis dentibus lanceolatis patulis quam tubus campanulatus duplo brevioribus, corollæ tubo cylindrico, segmentis parvis orbicularibus, genitalibus longe exsertis.

A much-branched erect shrub, with slender densely pilose terete branchlets. Leaves opposite, shortly petioled; blade $\frac{1}{3}$–$\frac{1}{2}$ in. long, obtuse, cuneate at the base, thick and rigid in texture, dull green and glabrous on both surfaces, the veins fine and obscure. Flowers in dense orbicular terminal panicles 1–$1\frac{1}{2}$ in. in diam.; branches and short pedicels densely hispid. Calyx $\frac{1}{8}$ in. long, slightly pilose, with a campanulate tube and 5 spreading segments. Corolla with a cylindrical glabrous tube $\frac{1}{4}$ in. long and 4 orbicular segments, the expanded limb not above $\frac{1}{8}$ in. in diam. Style exserted $\frac{1}{3}$–$\frac{1}{2}$ in. from the corolla-tube.—Woods of the province of Imerina, *Baron* 1985 ! A near ally of *C. emirnense*, Bojer, which is figured in Bot. Mag. tab. 2925.

Clerodendron ternifolium, n. sp.

Arboreum, erectum, glabrum, foliis ternatis breviter petiolatis lanceolatis integris firmulis utrinque viridibus, floribus in cymas laxas paniculatas terminales dispositis, pedicellis brevibus, calycis dentibus deltoideis quam tubus oblongus quadruplo brevioribus.

An erect tree, glabrous in all its parts, with long woody simple slender straight ultimate branchlets, with internodes ½–1 in. long. Leaves in threes, ascending, shortly petioled, 2–3 in. long, ½ in. broad at the middle, narrowed gradually to both ends, rather firm in texture, green and glabrous on both surfaces. Flowers in flat-topped terminal panicled cymes at the end of the long branchlets; pedicels slender, not more than ⅛ in. long. Calyx ½–⅝ in. long, glabrous, ¼–⅓ in. diam. at the throat; teeth deltoid, erect, not more than ⅛ in. long and broad. Corolla not seen. Ovary small, globose.—Central Madagascar, *Baron* 1680! Allied to *C. arenarium* and *C. laxiflorum*.

Clerodendron laxiflorum, n. sp.

Arboreum, erectum, glabrum, foliis oppositis petiolatis obovato-oblongis acutis modice firmis, floribus in cymas laxas paniculatas axillares et terminales dispositis, pedicellis elongatis, calycis dentibus deltoideo-cuspidatis quam tubus oblongus triplo brevioribus, corollæ tubo quam calyx duplo longiore, limbi lutei segmentis orbicularibus vel obovatis, staminibus vix exsertis.

An erect forest tree, 20–30 feet high, glabrous in all its parts. Leaves opposite, shortly petioled; blade 2–3 in. long, 1–1¼ in. broad, acute, narrowed from the middle to the base, moderately firm in texture, green and glabrous on both surfaces. Flowers in lax axillary and terminal compound corymbose cymes; pedicels about ½ in. long, with minute linear bracts and bracteoles. Calyx ½ in. long, greenish, glabrous, with an oblong tube ¼–⅓ in. in diam. and 5 erect segments. Corolla yellow, with a tube an inch long, cylindrical below the dilated throat; segments of the limb spreading, ¼–⅓ in. long. Stamens reaching only to the tip of the corolla-segments. Style finally a little exserted.—Forests of the province of Imerina, *Baron* 1291! Andrangaloaka, *Parker*!

Clerodendron rubellum, n. sp.

Fruticosum, erectum, glabrum, foliis oppositis oblongis obtusis integris petiolatis subcoriaceis utrinque viridibus glabris, floribus in cymas paucifloras paniculatas dispositis, pedicellis elongatis, calycis magni segmentis deltoideis quam tubus oblongus 3–4plo brevioribus, corollæ rubellæ tubo cylindrico calycem subduplo superante, segmentis magnis orbicularibus, genitalibus longe exsertis.

An erect shrub, 10–15 feet high, glabrous in all its parts, with slender terete brown lenticellate branchlets. Petiole $\frac{1}{2}$ in. long; blade 3–4 in. long, $1\frac{1}{4}$–$1\frac{1}{2}$ in. broad, obtuse or subobtuse, narrowed gradually to the base, moderately firm in texture, green and glabrous on both surfaces, with distant distinct arcuate ascending main veins like those of *Cerbera*. Flowers in fascicles of few-flowered peduncled cymes from the end or upper nodes of the branchlets; pedicels erect, $\frac{1}{4}$–$\frac{1}{2}$ in. long; bracts few, minute, linear. Calyx $\frac{5}{8}$–$\frac{3}{4}$ in. long, with an oblong tube $\frac{1}{3}$ in. in diam. and 5 small erect segments. Corolla pinkish, fragrant, with a cylindrical tube $1\frac{1}{4}$ in. long and an expanded limb an inch in diameter. Style exserted an inch from the corolla-tube.—Woods near Tamatave, gathered by Dr. Meller in July 1862.

CLERODENDRON? PETUNIOIDES, n. sp.

Arborea, glabra, foliis petiolatis oblongis integris acutis, floribus 1–2nis longe pedicellatis, calycis magni segmentis oblongo-deltoideis tubo oblongo-infundibulari subæquilongis, corollæ tubo infundibulari quam calyx paulo longiore, segmentis oblongis quam tubus paulo brevioribus, genitalibus haud exsertis.

An erect shrub or small tree, glabrous in all its parts, with slender woody terete branchlets. Leaves opposite, shortly petioled; blade 2–3 in. long, 1–$1\frac{1}{4}$ in. broad at the middle, acute, deltoid at the base, moderately firm in texture, bright green and glabrous on both surfaces. Flowers solitary or in pairs at the end of the branchlets, on slender erect pedicels $\frac{3}{4}$–1 in. long. Calyx $1\frac{1}{4}$–$1\frac{1}{2}$ in. long, membranous, greenish, glabrous, the 5 oblong-deltoid acute segments rather shorter than the tube. Corolla purple, $2\frac{1}{2}$–3 in. long, with 5 equal oblong segments nearly an inch long and a funnel-shaped tube an inch in diameter at throat. Stamens and style not reaching beyond the tip of the corolla-segments.—Forests of the province of Imerina, *Parker*! Ankeramadinika, *Baron* 1624! A very fine and very distinct species. It differs from *Clerodendron* by the 5 equal divisions of its corolla-limb and non-exserted stamens, and may prove a new genus. The fruit is unknown.

PLECTRANTHUS LAVANDULOIDES, n. sp.

Perennis, caulibus strictis tetragonis, foliis paucijugis remotis parvis lanceolatis integris crassis obscure pilosis, floribus in paniculam terminalem ramis brevibus patulis secundis simplicibus vel furcatis dispositis, pedicellis brevissimis, calycis tubo campanulato curvato dense piloso dentibus lanceolato-deltoideis, corollæ tubo infundibulari quam calyx 2–3plo longiore labio supremo parvo erecto, inferiore obovato longiore, staminibus subexsertis.

A perennial herb, with the habit of the common Lavender (*Lavandula vera*), branched at the base, with slender stiff erect square obscure pilose flowering stems a foot or more long. Leaves in a few distant pairs, lanceolate, sessile, erecto-patent, about an inch long, thick in texture, obscurely pilose. Panicle 3-4 in. long, of about 10 pairs of simple or forked spreading secund branches under an inch long; flowers all deflexed; rhachis and short pedicels densely pilose; bracts minute. Calyx $\frac{1}{12}$ in. long, with a curved tube and small teeth. Corolla lilac, $\frac{1}{12}$ in. long, with a curved pilose long funnel-shaped tube, a small orbicular upper lip, and a much larger lower one. Stamens just exserted beyond the tip of the lower lip.—Central Madagascar, *Baron* 978!

PLECTRANTHUS HEXAPHYLLUS, n. sp.

Perennis, caulibus brevibus simplicibus dense breviter pilosis, foliis paucijugis petiolatis ovatis obtusis crenatis membranaceis facie hispidis dorso pilosis, racemis laxis basi compositis, bracteis latis foliaceis dense pilosis, pedicellis quam calyx longioribus, calycis pilosi tubo campanulato dentibus parvis superioribus deltoideis inferioribus lanceolatis, corollæ tubo calyci subæquilongo, labio superiore orbiculari, inferiore trilobato, staminibus breviter exsertis.

A perennial herb, with slender densely pilose ascending simple stems about $\frac{1}{2}$ ft. long. Leaves in 2–3 opposite pairs below the inflorescence; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. long, densely pilose; blade 1–$1\frac{1}{2}$ in. long, obtuse, rounded or subdeltoid at the base, dark green and rough with the tuberculate bases of short bristly hairs above, shortly hispid below with slightly raised brown hispid reticulated veins. Flowers in a lax raceme 2–3 in. long, of several whorls, the lowest only compound at the base, each with a pair of small foliaceous bracts broader than long, densely clothed with bright red-brown hairs; pedicels $\frac{1}{8}$–$\frac{1}{6}$ in. long. Calyx $\frac{1}{12}$–$\frac{1}{8}$ in. long, membranous, dark green, strongly ribbed; upper teeth small, deltoid; lower larger, lanceolate. Corolla-tube just longer than the calyx; lips short; upper orbicular, lower with 3 small orbicular lobes. Stamens just exserted beyond the lower lip.—Central Madagascar, *Baron* 1799!

MICROMERIA FLAGELLARIS, n. sp.

M. caule decumbente piloso ramosissimo, foliis parvis sessilibus crebris ovatis, majoribus crenatis, floribus axillaribus solitariis brevissime pedicellatis, calycis dentibus lanceolato-deltoideis quam tubus triplo brevioribus, corollæ tubo piloso calyci æquilongo, labio superiore orbiculari, inferiore majore trilobato, genitalibus inclusis.

A perennial herb, with slender square finely pilose stems a foot or more long, with numerous short ascending simple branches. Leaves crowded, decussate, ascending, firm in texture, green and pilose on both surfaces, the lower almost orbicular, crenate, $\frac{1}{6}$ in. long, the upper smaller, ovate, and entire. Flowers solitary, from the axils of a few of the upper leaves, on very short pedicels. Calyx $\frac{1}{6}$ in. long, with 10 hispid ribs and a funnel-shaped tube and 5 equal small teeth. Corolla densely pilose, twice as long as the calyx, the lower lip with an orbicular erect lobe nearly $\frac{1}{12}$ in. broad and two smaller side ones.—Central Madagascar, *Baron* 2062! 2065!

MICROMERIA SPHÆROPHYLLA, n. sp.

Perennis, dense pilosa, caule ramosissimo, foliis sessilibus rigidis cordato-ovatis integris parvis, floribus axillaribus solitariis, pedicellis brevissimis, calycis dentibus parvis lanceolatis, corollæ tubo calyci æquilongo, labio superiore parvo orbiculari emarginato, inferiore majore trilobato, genitalibus inclusis.

A perennial herb, with slender much-branched ascending densely pilose stems about a foot long. Leaves crowded on the branches, $\frac{1}{8}$–$\frac{1}{6}$ in. long, broad ovate, cordate at the base, firm in texture, quite entire, bright green and pilose on both surfaces. Flowers solitary, from the axils of the upper leaves, on very short pedicels. Calyx $\frac{1}{6}$ in. long, with 10 strong ribs, a funnel-shaped tube, and 5 equal small teeth. Corolla-tube just as long as the calyx; upper lip small, broader than long; lower $\frac{1}{6}$ in. long and broad, with 3 orbicular segments.—Central Madagascar, *Baron* 2141! A near ally of the last species.

SALVIA (§ EUSPHACE) PARVIFOLIA, n. sp.

Herbacea, perennis, caulibus simplicibus obscure pilosis, foliis sessilibus ovatis parvis obtusis subcoriaceis margine crispato-crenulatis facie viridibus dorso albo-incanis, racemis elongatis, verticillis pluribus distantibus multifloris, bracteis parvis foliaceis, pedicellis brevibus pilosis, calycis glandulosi dentibus lanceolato-deltoideis quam tubus duplo brevioribus, corollæ tubo quam calyx paulo longiore, labio superiore oblongo, inferiore majore trilobato, genitalibus inclusis, antherarum loculo altero minuto producto.

A perennial herb, much branched at the crown of the root, with slender square erect simple stems 1–1½ ft. long. Leaves in numerous decussate pairs on the lower part of the stem, about ½ in. long, quite sessile, obtuse, firm in texture, minutely crispato-crenulate on the margin, bright green above, matted with white tomentum beneath. Racemes 3–6 in. long; whorls 4–8, with 6–10 flowers in each; pedicels shorter than the calyx. Calyx ⅙ in. long, copiously glandular; tube almost campanulate. Corolla ½ in. long, pale lilac, glabrous; upper lip ⅙ in. long; lower twice as long, with small side and a large orbicular end lobe. Anthers contained in the upper lip of the corolla, the end cell oblong, and the short spreading fork of the connective also bearing a small oblong cell.—Central Madagascar, *Baron* 2011! 2073! 2074! Mr. Baron has also regathered all the four species gathered on the Ankarata Mountains by Mr. Kitching, which I described in Journ. Linn. Soc. vol. xviii. pp. 275–277.

STACHYS (§ STACHYOTYPUS) SPHÆRODONTA, n. sp.

Perennis, dense pilosa, caulibus brevibus simplicibus, foliis plurijugis sessilibus oblanceolato-oblongis obtusis conspicue crenatis, verticillis multifloris in racemum terminalem aggregatis, bracteis parvis, pedicellis brevibus, calycis dense hispidi dentibus lanceolato-deltoideis mucronatis quam tubus duplo brevioribus, corollæ tubo calyci æquilongo, labio superiore obovato, inferiore majore trilobato, genitalibus inclusis.

An erect perennial herb, with simple densely pilose ascending stems 6–9 in. long. Leaves in several decussate pairs on the lower part of the stem, erecto-patent, 1½–2 in. long, ½ in. broad, thick in texture, closely deeply crenate, green and hispid on the upper surface, pale green and densely hispid, with raised brown veins, beneath; upper leaves smaller and more distant. Racemes 2–4 in. long; whorls 4–8, with 6–10 flowers in each; bracts minute; pedicels very short. Calyx ⅙ in. long, densely pilose. Corolla with a tube just as long as the calyx, a densely pilose small orbicular upper lip, and a larger lower one (⅙ in. long) with 3 orbicular lobes. Stamens and stigma reaching out of the tube into the upper lip of the corolla.—Central Madagascar, *Baron* 2127!

STACHYS (§ STACHYOTYPUS) OLIGANTHA, n. sp.

Perennis, glabra, caulibus brevibus simplicibus, foliis paucijugis sessilibus oblanceolatis obtusis integris vel parce dentatis, racemis laxis terminalibus paucifloris, bracteis foliis conformibus, pedicellis brevissimis,

calycis tubo infundibulari, dentibus lanceolato-deltoideis parce pilosis quam tubus duplo brevioribus, corollæ lilacinæ tubo calyci æquilongo, labio supremo parvo orbiculari, inferiore majore trilobato, genitalibus inclusis.

A perennial, branched at the crown of the root, with slender simple glabrous stems under half a foot long. Leaves in 4–6 pairs below the inflorescence, sessile, oblanceolate, $\frac{1}{2}$ in. long, narrowed gradually from the middle to the base, moderately firm in texture, green and quite glabrous on both surfaces. Racemes of 2–3 distant 1–2-flowered whorls; pedicels very short; bracts like the leaves in shape and texture. Calyx $\frac{1}{6}$ in. long, funnel-shaped, with a few hairs about the teeth; ribs 10, faint. Corolla with a tube equalling the calyx; upper lip orbicular, under $\frac{1}{12}$ in. long and broad; lower $\frac{1}{4}$ in. long, with an orbicular unguiculate terminal and two oblong erecto-patent side lobes. Stamens and style not exserted from the upper lip of the corolla.—Central Madagascar, *Baron* 2124! Allied to the Cape *S. humifusa*, Burchell.

STACHYS (§ STACHYOTYPUS) DEBILIS, n. sp.

Perennis, glabra, caulibus debilibus, foliis distantibus parvis sessilibus oblongis vel lanceolatis parce serratis, racemis laxis paucifloris, verticillis bifloris foliis reductis bracteatis, pedicellis brevissimis, calycis segmentis lanceolato-deltoideis quam tubus infundibularis triplo brevioribus, corollæ lilacinæ pilosæ tubo quam calyx duplo longiore, labio superiore parvo orbiculari, inferiore majore trilobato, genitalibus inclusis.

A branched perennial herb, with slender square glabrous stems. Leaves in distant pairs, sessile, oblong or lanceolate, $\frac{1}{2}$–$\frac{3}{4}$ in. long, acute or obtuse, finely serrated, moderately firm in texture, green and glabrous on both sides. Racemes of 3–4 distant whorls, two flowers in each, bracteated by reduced leaves at most as long as the calyx; pedicels very short, ascending. Calyx $\frac{1}{6}$ in. long, slightly pilose, with 10 distinct ribs. Corolla pilose, with a subcylindrical tube $\frac{1}{3}$ in. long, a small orbicular upper lip, and a 3-lobed lower one $\frac{1}{6}$ in. long. Stamens reaching out of the tube into the galeate upper lip of the corolla.—Central Madagascar, *Baron* 2109! A near ally of *S. oligantha*.

AJUGA FLACCIDA, n. sp.

A. caule ramoso decumbente obscure piloso, foliis petiolatis oblanceolato-oblongis obtusis membranaceis repando-crenatis utrinque viridibus obscure pilosis, floribus dense distanter verticillatis, bracteis quam flores longioribus, pedicellis brevissimis, calycis tubo infundibulari segmentis lanceolatis,

corollæ tubo calyci æquilongo, labio superiore minimo truncato, labio inferiore trilobato, genitalibus quam labium inferius brevioribus.

A perennial herb, with a decumbent main stem above a foot long and several ascending branches. Leaves 1½–2 in. long, narrowed very gradually from the middle to the base or petiole, deltoid at the tip, ½–¾ in. broad, with a few large irregular teeth, thin in texture, green and nearly glabrous on both surfaces. Flowers in numerous whorls in the axils of the reduced upper leaves, the uppermost only as long as the flowers; pedicels very short. Calyx ⅙ in. long, pilose; teeth lanceolate acuminate, a little shorter than the tube. Corolla ¼ in. long; lower lip ⅙ in. long.—Central Madagascar, *Baron* 767!

AJUGA ROBUSTA, n. sp.

Perennis, caulibus robustis tetragonis breviter pilosis, foliis subsessilibus ovato-rhomboideis profunde crenato-laciniatis utrinque breviter hispidis viridibus, floribus dense distanter verticillatis, bracteis magnis foliaceis, pedicellis brevissimis, calycis pilosi tubo infundibulari, dentibus lanceolato-deltoideis, corollæ tubo calyci æquilongo, labio superiore truncato, labio inferiore trilobato, genitalibus quam labium inferius brevioribus.

A robust perennial herb, with simple ascending square stems above a foot long. Leaves in decussate pairs, 1–2 inches apart, subsessile, erecto-patent, 1–1½ in. long, cuneate and entire at the base, the rest of the margin deeply and irregularly crenato-laciniate; texture thick, moderately firm; both surfaces green and shortly hispid, with close distinct ascending veins. Whorls of flowers forming a spike at the end of the stem, and about four separate ones below, much exceeded by their subtending leaves. Calyx with a tube ⅛–⅙ in. long and 5 small teeth. Corolla blue, with a tube as long as the calyx (including its teeth), a truncate minute upper lip, and a lower one ⅙ in. long, with a large orbicular ciliated terminal segment and two small side ones.—Central Madagascar, *Baron* 1997!

SELAGO MURALIS, *Benth. et Hook. f. Gen. Plant.* ii. p. 1129.

Perennis, ramulis scabridulis, foliis fasciculatis anguste linearibus integris glabris, floribus minutis spicas laterales patentes numerosas breves subcapitatas densas post anthesin efformantibus, bracteis oblongo linearibus crassiusculis glabris, calyce 3-partito segmentis ciliatis lateralibus subulato-linearibus segmento postico minore vel subabortivo, corollæ tubo brevi segmentis rotundatis quam tubus quadruplo brevioribus, staminibus subinclusis, stylo simplici subincluso, fructu ovoideo subcompresso in coccos 2 secedente.

A small spreading shrub about a foot high, with numerous branches chiefly from the base, puberulous when young, becoming somewhat scabrid in age. Leaves crowded, especially near base of branches, subsessile, narrowly linear, subobtuse, entire, a little wrinkled in drying, 1–3 lin. long. Spikes numerous, on short lateral branchlets terminating the upper half of the branches, 2–3 lin. long when in flower, but growing out to 6 lin. in fruit. Flowers numerous, ½ lin. long. Bracts equalling flowers. Calyx ¼ lin. long, the two lateral lobes developed, the posterior lobe smaller, often suppressed. Corolla-tube stout, ¼ lin. long, nearly 4 times exceeding the minute lobes. Fruit ¼ lin. long, separating into 2 nutlets when mature.—Central Madagascar, *Baron* 1986! Antananarivo, *Parker*! Ambohimanga, *Parker*! Dr. Parker says, "Small herbs growing in open ground, in grass, on banks, &c." Also gathered long ago by Bojer! in the same locality, and quite recently by the Rev. Deans Cowan. Closely allied to *S. lacunosa*, Klotzsch, from Mozambique, and *S. micrantha*, Choisy, from the Cape of Good Hope, the latter place the headquarters of the genus. *S. muralis* is interesting as being the only known representative of the genus occurring off the continent of Africa.—*R. A. Rolfe.*

DESCRIPTION OF THE PLATES.

PLATE XXIV.

A. *Schismatoclada psychotrioides*, n. sp. 1. Portion of the plant in flower. 2. Calyx and pistil. 3. Corolla laid open. 4. Ovary. 5. Fruit. 6. Seed. 7. Embryo.

B. *Schismatoclada*, sp. 8. Portion of the plant in fruit.

PLATE XXV.

Tetraspidium laxiflorum, n. sp. 1. Plant in flower (bent). 2. Calyx and pistil. 3. Corolla laid open. 4. Anther. 5. Ovary.

PLATE XXVI.

Monachochlamys flagellaris, n. sp. 1. Plant in flower. 2. Bract. 3. Calyx and pistil. 4. Base of corolla laid open. 5. Anther. 6. Ovary. 7. Transverse section of the ovary.

PLATE XXVII.

Forsythiopsis Baroni, n. sp. 1. Portion of a plant in flower. 2. Calyx and pistil. 3. Base of corolla laid open. 4. Front and back views of an anther. 5. Ovary. 6. Longitudinal section of the ovary.

Contributions to the Flora of Madagascar.—Part III. Incompletæ, Monocotyledons, and Filices. By J. G. Baker, F.R.S., F.L.S.

[Read February 15, 1883.]

In the present paper the description of the novelties contained in the collections recently received from Madagascar is completed. There are no new genera amongst the Incompletæ or Monocotyledons, except *Cephalophyton*, of which the material is still incomplete. Most of the new species described in the present paper belong to the large widely spread tropical genera. Characteristically Cape types are represented by *Faurea*, *Peddiea*, *Dais*, *Kniphofia*, and *Dipcadi*, one species each, by three Aristeas, and four Aloes. Of *Obetia*, of which there are either four species or striking varieties in Madagascar in addition to one already described by Weddell, there is only a single additional species, which is common to Mauritius, Bourbon, and Rodriguez. The Bamboo of the forests of Central Madagascar is the same species that is found plentifully in the mountain-woods of the centre of Bourbon. Of the Alismaceous genus *Wisneria* one species is Indian, one Central-African, and a third found in Central Madagascar. We have Asiatic types in *Lophatherum*, of which the two species already known belong to the Himalayas, Japan, China, and the Malay archipelago; and *Eriocaulon fluitans*, which belongs to a well-marked group of species known previously only in Tropical Asia and Australia.

Mr. C. B. Clarke has kindly undertaken the determination of all our Madagascar specimens of *Cyperus*, and has given me, with permission to incorporate it in this paper, a synopsis with synonyms of all the species known in Madagascar and the neighbouring islands.

In this paper I have not attempted to deal with the Asclepiadaceæ or Orchidaceæ, of both of which natural orders there are a considerable number in the collections. In both orders a considerable number of species have been already described from the island, with which the new material will require to be carefully compared.

INCOMPLETÆ.

CORRIGIOLA PSAMMATROPHOIDES, n. sp.

Annua, glabra, dense cæspitosa, caulibus stramineis erectis multoties dichotome furcatis, foliis parvis distantibus oblanceolatis alternis vel oppositis, floribus copiose umbellatis pedicellis brevissimis, perianthii tubo brevissimo segmentis oblongis viridibus margine albis, fructu globoso-triquetro brunneo glabro.

An erect densely tufted annual herb, with slender straw-coloured stems 3–4 inches long, many times dichotomously forked, with intertangled erecto-patent branches. Leaves few, distant, glabrous, $\frac{1}{4}$ in. long, narrowed from the middle to the base, 1-nerved, usually alternate. Flowers in copious dense umbels in the forks and at the end of the branches, mixed with leaves like those of the stem; pedicels very short. Perianth not more than $\frac{1}{3}$ line long, green, glabrous, with a short tube and five oblong imbricated segments with a distinct white edge. Fruit globose-triquetrous, hard, brown, nearly as long as the perianth.—Central Madagascar, *Baron* 2153! Habit of *Psammatrophe*, an endemic Cape genus of *Ficoideæ*. This adds the order *Illecebraceæ* to the Madagascar flora.

CYATHULA (§ POLYSCALIS) SPHÆROCEPHALA, n. sp.

C. caulibus erectis dense pilosis, foliis petiolatis cordato-ovatis acutis utrinque pilosis, floribus albis basi lanosis in glomerulos globosos terminales aggregatis, fertilibus perianthii segmentis 5, exterioribus 2 navicularibus dorso 1-nervatis, 3 interioribus planis lanceolatis rigidulis dorso nervis tribus viridibus percursis, sterilibus lanceolatis apiculatis apice rectis vel glochidiatis.

A tall erect branched perennial herb, with densely pilose angled stems. Leaves in distant pairs; petiole $\frac{1}{2}$–1 in. long; blade 2–3 in. long, broad ovate, cuspidate, shallowly cordate at the base, moderately firm in texture, dull green on both sides, thinly hairy above, densely villose all over beneath. Flowers in globose heads $\frac{1}{2}$–$\frac{3}{4}$ in. in diam., sessile in the axil of the topmost pair of leaves. Fertile perianth $\frac{1}{8}$ in. long, the two outer segments navicular, white with a 1-nerved greenish-brown keel; three inner segments flat, lanceolate, firm in texture, with a white border and green centre. Barren flowers as long as the fertile, lanceolate at the base, more or less distinctly cuspidate, with a straight or hooked tip.—Central Madagascar, *Baron* 1135! Allied to *C. globulifera*, Moquin, which is also a Madagascar plant.

POLYGONUM (§ ECHINOCAULON) BRACHYPODUM, n. sp.

P. caule gracili erecto ramoso aculeis retrorsis sæpissime horrido, foliis brevissime petiolatis lanceolatis basi sæpe sagittatis, capitulis paucis parvis globosis terminalibus pedunculis strictis glanduloso-setosis, bracteis latis minutis scariosis, perianthii rubri segmentis 5 obovatis, stylis 2, fructu globoso-lenticulari castaneo nitido.

An erect herb, with slender terete branched stems, armed usually with deflexed prickles, but sometimes without them. Ochreæ loose, brown, scariose, fringed at the margin. Leaves distant, ascending, with a very short petiole and a lanceolate blade 3–4 in. long, with two acute auricles at the base and fringed with bristles along the edge. Heads few or many, $\frac{1}{4}$ in. long, in a lax corymb on stiff slender ascending glanduloso-setose peduncles; broad scariose bracts only about as long as the very short pedicels. Perianth bright red, $\frac{1}{12}$ in. long, with 5 obovate segments. Stamens 5, included. Nut brown, glossy, globose, $\frac{1}{2}$ lin. in diam. Styles two, nearly as long as the ovary; stigmas capitate. Central Madagascar, gathered long ago by Bojer and Hilsenberg, and distributed by them as "*P. sagittatum*" and "*P. hastatum*," both of which names are very appropriate, but already occupied, and now refound by Dr. Parker and Mr. Baron. Native name "Maharamomby." A near ally of the Indian *P. pedunculare*, Wallich.

PEPEROMIA BARONI, n. sp.

Perennis, glabra, caule erecto furcato, foliis verticillatis 3–4nis petiolatis oblongis obtusis firmulis obscure triplinerviis, spicis simplicibus terminalibus breviter pedunculatis, rhachi glabra, bracteis minutis orbicularibus, fructu globoso leviter immerso stigmate sessili centrali.

A perennial, with slender once-forked erect stems half a foot long, glabrous in all its parts. Leaves in 4–5 whorls, the lower in threes, those at the fork and end of the branches in fours; petiole $\frac{1}{6}$ in. long; blade oblong, $\frac{1}{2}$–1 in. long, obtuse, deltoid at the base, moderately thick and firm in texture, with a distinct midrib and two obscure side nerves ascending from its base. Spikes simple, shortly peduncled, erect, $1\frac{1}{2}$–2 in. long. Ovaries globose, a little immersed in the axis, with a sessile central stigma.—Central Madagascar, *Baron* 1055! Mr. Baron has lately gathered *P. borbonense*, C. DC., in the province of Imerina (1280), and the forest of Alamazaotra (1539), and *P. subpeltatum*, Willd., in the province of Tanala and woods between Tankay and the east coast (1519).

TAMBOURISSA ROTA, n. sp.

Arborea, glabra, ramulis gracilibus teretibus, foliis oppositis breviter petiolatis oblongis acutis vel subobtusis rigide subcoriaceis utrinque viridibus venulis subtilibus immersis, floribus fœmineis solitariis axillaribus globoso-turbinatis glabris breviter pedunculatis, fructu magno globoso carpellis confertis ovoideis.

A small tree, with slender terete branchlets, glabrous in all its parts. Leaves opposite; petiole about $\frac{1}{4}$ in. long; blade 2–3 in. long, $\frac{3}{4}$–$1\frac{1}{4}$ in. broad at the middle, acute or obtuse, rounded or deltoid at the base, green on both surfaces, the main veins fine and immersed. Female flowers solitary from the axils of the leaves on short peduncles. Perianth thick, hard, black, glabrous, subglobose, $\frac{1}{4}$ in. in diam., flat on the top, with a closed depressed umbilicate centre. Fruit a globe $1\frac{1}{2}$ in. in diam. when dried, brown and hard when unripe, with a black leathery pericarp when ripe, splitting down nearly to the base, the ovoid horny carpels $\frac{1}{3}$ in. long covering all the face of the divisions.—Forests of Central Madagascar, *Parker*! *Baron* 790! 764! 1239! 1361! A very near ally of *T. purpurea*, A. DC. (*Ambora purpurea*, Tulasne, Monog. Monim. t. 26). Native name "Rota."

TAMBOURISSA TRICHOPHYLLA, n. sp.

Arborea, ramulis dense pilosis, foliis oppositis magnis breviter petiolatis oblongo-lanceolatis acutis basi rotundatis interdum prope apicem parce dentatis subcoriaceis facie obscure dorso dense pilosis, floribus fœmineis globosis pilosis solitariis breviter pedunculatis.

A tree, with slender terete woody branchlets, clothed towards the top with short dense grey hairs. Leaves opposite; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. long, stout, pilose; blade 6–8 in. long, $1\frac{1}{2}$–2 in. broad, acute, rounded at the base, entire or furnished with a few deltoid teeth near the top, moderately firm in texture, dull green and rough with a few short bristly hairs above, pale and densely pilose beneath, especially on the raised midrib and few distant arcuate ascending main veins. Female flowers only seen, solitary, globose, on short peduncles from the axils either of young or full-grown leaves. Perianth $\frac{1}{4}$ in. in diam., filled inside with the numerous ovoid glabrous brown ovaries, which are not at all immersed in the perianth.—Forests of Central Madagascar, *Baron* 1953! 1975 *a*! A plant labelled "Amboratseroka" by Dr. Parker is no doubt a nearly allied species. It has oblong obtuse coriaceous leaves 2–3 in. long densely hairy beneath.

CRYPTOCARYA MYRISTICOIDES, n. sp.

C. ramulis flexuosis apice parce pubescentibus, foliis petiolatis oblongo-lanceolatis acutis utrinque viridibus glabris, floribus in paniculas copiosas ramis ferrugineo-tomentosis quam folium multo breviores dispositis, pedicellis brevissimis, perianthii ferrugineo-tomentosi segmentis oblongis quam tubus globosus duplo longioribus.

A tree, with remarkably flexuose terete purplish-brown bloomy copiously lenticellate branchlets, slightly ferrugineo-pubescent towards the top. Leaves alternate; petiole ½ in. long; blade 4–5 in. long, 1–1½ in. broad, acute, entire, deltoid or rather rounded at the base, rigidly coriaceous in texture, green and glabrous on both surfaces, the 9–10-jugate main veins fine and little raised. Flowers in copious decompound axillary and terminal panicles not more than 1–2 in. long, including the short peduncle, with corymbose branchlets, both branches and perianth thinly coated with ferruginous tomentum. Perianth ⅛ in. long, the six imbricated oblong segments twice as long as the tube. Fruit not seen.—Central Madagascar, *Baron* 1926! Perville's No. 233 is apparently a fourth undescribed species of this genus, differing from the present plant by its longer, more rigid and more glossy leaves and very dense deltoid panicles, of which both the branchlets and flowers are thickly coated with ferruginous tomentum.

CRYPTOCARYA DEALBATA, n. sp.

C. ramulis glabris, foliis parvis petiolatis oblongis obtusis rigide coriaceis facie viridibus glabris dorso glaucescentibus, floribus in paniculas parvas folio æquilongas ramulis ferrugineo-pilosis dispositis pedicellis brevissimis, perianthii ferrugineo-tomentosi segmentis oblongis quam tubus globosus longioribus.

An erect tree, with slender terete glabrous branchlets. Leaves alternate, shortly petioled, 1–1½ in. long, rounded at both ends, entire, green and rather glossy above, glaucous and glabrous beneath, with 5–6 pairs of moderately distinct parallel erecto-patent main veins. Panicles small, about as long as the leaves, distinctly peduncled, with a few short corymbose branches, both branchlets and flowers densely ferrugineo-tomentose. Perianth $\frac{1}{12}$ in. long, the six oblong segments twice as long as the globose tube. Fruit not seen.—Woods at Ampasimpotsy, *Baron* 1370!

CRYPTOCARYA CRASSIFOLIA, n. sp.

C. ramulis crassis lenticellatis apice solum ferrugineo-pubescentibus, foliis petiolatis oblongis obtusis crassis rigide coriaceis facie viridibus nitidulis dorso ferrugineo-tomentosis, floribus in paniculas latas decompositas ramis ferrugineis dispositis pedicellis brevissimis, bracteis minutis deltoideis, perianthii dense ferrugineo-tomentosi segmentis oblongis, fructu nigro glabro depresso-globoso.

A tree, with stout terete purplish-black branches, with copious large lenticels, pilose only towards the young tops. Leaves alternate, shortly petioled, 3–4 in. long, 1½–2 in. broad, rounded at both ends, very thick and rigid in texture, glabrous and rather glossy above, ferruginous beneath when young, but only inconspicuously pilose when mature, with 5–6 pairs of conspicuous parallel ascending main veins. Flowers in copious broad peduncled decompound lateral and terminal panicles about as long as the leaves, both branches and perianth densely ferrugineo-tomentose. Perianth ⅛ in. long, the six oblong imbricated segments twice as long as the globose tube. Fruit hard, black, depresso-globose, ½ in. in diam.—Central Madagascar, in the forests of the province of Imerina, *Baron* 1305!

OCOTEA (§ MESPILODAPHNE) ACUMINATA, n. sp.

O. ramulis dense pilosis, foliis petiolatis oblongo-lanceolatis acuminatis facie viridibus demum calvatis dorso dense pilosis reticulato-venulosis, racemis paucifloris quam folium multo brevioribus pedicellis flori æquilongis dense pilosis, bracteis parvis lanceolatis, perianthii dense pilosi segmentis oblongis quam tubus turbinatus duplo longioribus.

An erect tree, with slender terete woody densely pilose branchlets. Leaves crowded, alternate; petiole pilose, ⅓–½ in. long; blade 3–4 in. long, 1–1¼ in. broad at the middle, very acuminate, deltoid at the base, subcoriaceous, pilose when young on the upper surface, but almost or quite glabrous when mature, densely clothed with soft short drab hairs beneath, the 5–6-jugate very ascending main veins and all the veinlets prominently raised. Flowers in sparse simple or binate racemes about an inch long, peduncle included; axis and erecto-patent pedicels densely pilose, the latter and the brown scariose lanceolate bracts about as long as the flowers. Perianth ⅛ in. long, densely pilose, the oblong spreading brownish segments twice as long as the turbinate tube. Fruit not seen.—Central Madagascar, *Baron* 1970!

OCOTEA (§ MESPILODAPHNE) TRICHOPHLEBIA, n. sp.

O. ramulis dense pilosis, foliis petiolatis magnis oblongis acutis facie primum parce pilosis demum calvatis dorso præsertim ad venas dense pilosis venulis reticulatis, racemis laxis paucifloris longe pedunculatis basi sæpe compositis, pedicellis dense pilosis quam flos longioribus, perianthii pilosi tubo hemisphærico segmentis oblongis, fructu globoso in tubum induratum cupulatum nigrum semiimmerso.

An erect tree, with densely pilose terete woody branchlets. Petiole under ½ in. long, densely pilose; blade 4–5 in. long, 1½–2¼ in. broad at the middle, acuminate, subdeltoid at the base, green on both sides, subcoriaceous when mature, nearly or quite glabrous above, persistently pilose beneath, the veins and veinlets all prominently raised. Flowers in sparse simple or slightly compound racemes much shorter than the leaves, on slender densely pilose erecto-patent peduncles an inch or more long; pedicels erecto-patent, ⅛–⅙ in. long; bracts minute, lanceolate, deciduous. Perianth under ⅛ in. long, densely pilose; tube small, hemispherical; segments 5, oblong. Fruit pale brown, globose, ½ in. in diam., half immersed in a black rigid glabrous truncate cupule.—Central Madagascar, in forests of the province of Imerina, *Baron* 1289! 1310! 1776!

FAUREA FORFICULIFLORA, n. sp.—Loranthus forficuliflora, *Bojer MSS.*

Arbuscula, ramulis glabris, foliis oblanceolato-oblongis acutis rigidulis nitidis glabris, racemis terminalibus oblongis, pedicellis patulis, bracteis minutissimis, perianthii brunnei tubo cylindrico cite ad basin fisso, segmentis oblongis 3 diu coalitis, staminibus ad faucem uniseriatis, ovario dense albo-villoso, squamulis hypogynis lanceolatis, stylo pollicari.

A small forest tree 10 or 15 feet high, glabrous in all its parts except the ovary. Leaves close, alternate, 4–5 in. long, ¾–1 in. broad, subcoriaceous in texture, green and glabrous on both surfaces, shining above, narrowed from the middle to a short petiole. Flowers in shortly peduncled moderately dense terminal racemes 3–5 in. long; pedicels patent, woody, ⅛ in. long, with a minute deltoid bract at the base. Perianth brownish, clavate, an inch long, obscurely white-silky, with a slender cylindrical tube which soon slits open down one side, and 4 oblong segments ⅙ in. long, three of which cohere permanently. Anthers 4, linear, inserted at the base of the perianth-segments, with very short filaments. Ovary small, densely clothed with white silky hairs; style filiform, glabrous, persistent, an inch long.—Forests of the province of Imerina, gathered long ago by Dr. Lyall, and now refound by Dr. Parker and the Rev. Deans Cowan. There are five other species of the genus now known at the Cape and in

Zambesi-land and Angola (see Welwitsch in Trans. Linn. Soc. xxvii. t. 20).

DAIS GNIDIOIDES, n. sp.

Fruticosa, ramulis villosis, foliis crebris sessilibus alternis lanceolatis parvis rigidis glabris, floribus in glomerulos globosos terminales dense villosos aggregatis, bracteis ovatis vel lanceolatis, perianthii tubo cylindrico villoso, segmentis oblongis parvis brunneis sæpissime 4, antheris prope tubi faucem biseriatis, stylo elongato.

A low shrub, with erect slender woody densely pilose branches. Leaves crowded, alternate, sessile, ascending, lanceolate, acute, $\frac{1}{2}$–$\frac{5}{8}$ in. long, rigid in texture, green and glabrous on both surfaces, with a distinct midrib and several obscure very ascending side veins. Flowers in dense globose densely villose heads nearly an inch in diameter when the flowers are expanded from the end of the branches; bracts silky on the back, brown, scariose, the outer ovate, $\frac{1}{4}$ in. long, the inner smaller, lanceolate. Perianth with a cylindrical pilose tube $\frac{1}{4}$ in. long, and usually 4 rarely 5 oblong brown segments $\frac{1}{12}$ in. long, silky on the outside. Anthers small, oblong, in two distinct rows at the top of the perianth-tube, nearly sessile. Style simple, reaching above the middle of the perianth-tube; stigma capitate.—Grassy hills of the province of Imerina, discovered long ago by Bojer, and now regathered by Mr. Baron 665! 2061! who has also refound *D. glaucescens*, Decne. (2094!).

PEDDIEA INVOLUCRATA, n. sp.

Arborea, glabra, foliis oblanceolato-oblongis rigidulis utrinque viridibus, umbellis terminalibus multifloris, pedunculo basi bractearum verticillo involucrato, pedicellis quam flos longioribus, perianthii viriduli tubo elongato cylindrico, segmentis 5 parvis patulis lingulatis apice tomentosis, staminibus prope tubi faucem biseriatis, fructu duro globoso.

An erect tree 20 or 40 feet high, with terete woody bright brown branches, glabrous in all its parts. Leaves alternate, 3–4 in. long, $\frac{3}{4}$–1 in. broad, narrowed to an obtuse tip and downwards gradually to the base, subcoriaceous, green on both surfaces, the veins except the midrib fine and obscure. Umbel at first sessile inside a dense whorl of oblong brown scariose bracts $\frac{1}{2}$ in. long; peduncle finally 2–3 in. long; pedicels under $\frac{1}{2}$ in. long, ebracteate. Perianth with a cylindrical greenish tube $\frac{1}{4}$ in. long and 5 small spreading lingulate obscurely tomentose segments. Stamens in two rows of 5 each near the top of the perianth-tube;

anthers oblong; filaments very short. Fruit globose, hard nearly black, bicarpellary, $\frac{1}{4}$ in. in diam.; style short, entire; stigma capitate.—Woods of the province of Imerina, *Dr. Parker*! *Baron* 1946! There are three species of the genus known before, two at the Cape and one on the mountains of Fernando Po.

LORANTHUS (§ DENDROPHTHOE) RUBRO-VIRIDIS, n. sp.

Glaber, ramulis teretibus rugosis, foliis parvis brevissime petiolatis obovato-oblongis minute cuspidatis rigide coriaceis uninerviis, floribus axillaribus 1–3nis breviter pedicellatis et pedunculatis, bracteola minuta unilaterali, calycis parvi tubo oblongo limbo brevissimo, corollæ tubo cylindrico gracillimo splendide rubro cite ad medium fisso, segmentis 5 oblanceolatis viridibus, antheris minutis oblongis.

A closely branched shrub, glabrous in all its parts, with slender pale drab terete branchlets, very rough with raised lenticels. Leaves $\frac{1}{3}$–$\frac{1}{2}$ in. long, distinctly petioled, cuneate at the base, rounded and minutely cuspidate at the tip, thick and rigid in texture, green when dried, with a distinct midrib that does not reach the top. Flowers usually in pairs, the erect pedicel longer than the calyx. Bracteole unilateral, very minute. Calyx $\frac{1}{12}$ in. long, with an oblong ovary and very short obscurely toothed collar-like limb. Corolla under an inch long, with a very slender bright red tube and 5 oblanceolate green segments finally $\frac{1}{8}$ in. long. Anthers minute, oblong.—Central Madagascar, *Baron* 2170!

LORANTHUS (§ DENDROPHTHOE) PARKERI, n. sp.

Glaber, ramulis teretibus, foliis oblongis brevissime petiolatis obtusis 1-nerviis rigide coriaceis basi deltoideis, floribus axillaribus sessilibus 2–4nis, bracteola unilaterali, calycis parvi tubo subgloboso, limbo campanulato dentibus deltoideis, corollæ tubo cylindrico rubro cite ad medium fisso, segmentis oblanceolatis viridibus, antheris lineari-oblongis.

A much-branched shrub, glabrous in all its parts, with terete brown branchlets, rough with raised lenticels. Leaves shortly petioled, $1\frac{1}{2}$–2 in. long, $\frac{3}{4}$–1 in. broad, very obtuse, deltoid at the base, very thick and rigid in texture, with the midrib faintly visible. Flowers up to four, sessile in the axils of the leaves. Calyx $\frac{1}{12}$ in. long, with a short collar-like limb with 5 deltoid teeth. Corolla an inch long, with a red tube slitting on one side halfway down and 5 oblanceolate green segments $\frac{1}{8}$ in. long. Anthers linear-oblong, $\frac{1}{12}$ in. long.—Forest of Andrangaloaka, *Dr. Parker*! Closely allied to *L. pachyphyllus*, Baker. A plant from the herbarium of Justice Blackburn, not localized, labelled "*L. filiflorus*, Bojer," is either conspecific with *L. pachyphyllus*, or very near to it. The branchlets are very rough with lenticels, the leaves broader, and the flowers solitary.

LORANTHUS (§ DENDROPHTHOE) MICROLIMBUS, n. sp.

Glaber, ramulis teretibus, foliis obscure petiolatis obovato-oblongis obtusis basi cuneatis crassis rigide coriaceis deorsum obscure trinervatis, floribus axillaribus glomeratis sessilibus, bracteola ovata acuta unilaterali, calyce parvo oblongo ore obscure dentato, corollæ rubræ tubo cylindrico gracillimo ad medium fisso, segmentis parvis oblanceolatis, antheris minutis oblongis.

A shrub, with slender terete pale brown branches, glabrous in all its parts. Leaves cuneately narrowed to an obscure petiole, 2–3 in. long, 1–1¼ in. broad, very obtuse, very thick and rigid in texture, brown when dried, with 3 nerves faintly visible towards the base. Flowers 4–8 in a cluster, sessile. Bracteole unilateral, ovate, with a cusp. Calyx green, scarcely $\frac{1}{12}$ in. long. Corolla red, 1–1¼ in. long, with a very slender tube and 5 oblanceolate segments not more than $\frac{1}{12}$ in. long. Anthers minute, oblong.—Forest of Alamazaotra, *Baron* 1407 !

LORANTHUS (§ DENDROPHTHOE) DIPLOCRATER, n. sp.

Glaber, ramulis teretibus, foliis subpetiolatis obovato-cuneatis crassis rigide coriaceis venis occultis, floribus solitariis axillaribus sessilibus, bracteola campanulata, calycis cylindrici rigidi limbo elongato apice minute dentato, corollæ rubræ tubo cylindrico cite ad medium fisso, segmentis 5 lanceolatis, antheris linearibus.

A much-branched shrub, glabrous in all its parts, with slender terete pale brown branchlets. Leaves mostly opposite, cuneately narrowed to a short indistinct petiole, 1–1¼ in. long, ¾–1 in. broad, rounded at the top, thick and rigid in texture, brown when dried, the veins quite hidden. Flowers always solitary, sessile in the axils of the leaves. Bracteole calyx-like, campanulate; calyx cylindrical, ¼ in. long, rigid in texture, drab, with a long limb minutely toothed at the tip, slit down one side in a late stage. Corolla red, 1¼–1½ in. long, the 5 lanceolate segments ⅙ in. long, the tube thicker in the upper half, slit on one side halfway down. Anthers ⅛ in. long, inserted at the base of the segments.—An-ranou-madion, Imerina province, *Bojer* ! Forest of Alamazaotra, *Baron* 1383 !

LORANTHUS (§ DENDROPHTHOE) GONOCLADUS, n. sp.

Glaber, ramis crassis tetragonis, foliis breviter petiolatis oblongis acutis magnis subcoriaceis penninerviis, floribus 3–6nis axillaribus breviter pedicellatis interdum brevissime pedunculatis, calycis tubo oblongo basi bracteola ovata suffulto, limbi dentibus quadratis, corollæ rubræ tubo cylindrico cite ad medium fisso, segmentis 5 lanceolatis, antheris linearibus.

Branches long, straight, stout, dull brown, with two ribs decurrent from the petiole. Petiole $\frac{1}{2}$ in. long; blade 3–4 in. long, $1\frac{1}{2}$–2 in. broad, deltoid at the base, moderately thick in texture, brownish when dried, quite glabrous, with a distinct midrib and many arcuate ascending indistinct parallel side ribs. Flowers in clusters in the axils of the leaves all down the branch; pedicel $\frac{1}{12}$ in. long. Calyx $\frac{1}{8}$ in. long, with a one-sided persistent bracteole; limb collar-like, with 5 quadrate teeth. Corolla red, an inch long, with 5 ligulate segments $\frac{1}{4}$ in. long and a tube which is soon slit on one side halfway down. Stamens inserted above the base of the segments. Berry oblong, $\frac{1}{4}$ in. long.—Tanala, *Baron* 296! Forest between Tankay and the east coast, *Baron* 1602!

LORANTHUS (§ DENDROPHTHOE) MONOPHLEBIUS, n. sp.

Glaber, ramulis gracilibus teretibus, foliis petiolatis obovato-oblongis obtusis basi cuneatis subcoriaceis uninervatis, floribus axillaribus 3–6 pedicellatis, bracteola ovata unilaterali, calycis tubo oblongo, limbo brevissimo campanulato obscure dentato, corollæ tubo curvato cylindrico cite ad medium fisso, segmentis 5 oblanceolatis, antheris linearibus.

A shrub, glabrous in all its parts, with slender terete drab woody branchlets. Leaves distinctly petioled, 2–$2\frac{1}{2}$ in. long, an inch broad, very obtuse, deltoid at the base, moderately thick in texture, green and glabrous on both sides, the midrib distinct through the lower half, but the other veins hidden. Flowers up to six from the axils of the leaves all down the branch; pedicels as long as the calyx. Calyx with an oblong tube $\frac{1}{8}$ in. long and a short collar-like obscurely toothed limb. Corolla red, with a curved cylindrical tube an inch long slit on one side halfway down, and 5 oblanceolate segments $\frac{1}{6}$ in. long. Anthers linear, $\frac{1}{8}$ in. long.—Central Madagascar, *Baron* 1931! These new species are all allied to *L. clavatus*, Desr. In the descriptions of *Loranthi* in Journ. Bot. 1882, pp. 245 and 267, there are two misprints in the figures. The corolla of *L. Baroni* is $1\frac{1}{4}$ in., and the anthers of *L. pachyphyllus* are $\frac{1}{8}$ in. long.

VISCUM ECHINOCARPUM, n. sp.

V. ramulis tetragonis, foliis sessilibus oblanceolatis obtusis rigide coriaceis venis immersis occultis, floribus paucis axillaribus sessilibus, singulis bracteolis 2 orbicularibus cuspidatis connatis suffultis, fructu parvo oblongo sessili papillis duris globosis rugoso stigmate subsessili.

Habit very like that of our European *V. album*, copiously closely dichotomously branched. Branches terete, glabrous or finely downy; ultimate branchlets greenish, 4-angled. Leaves in pairs $\frac{3}{4}$–1 in. apart, 1–1$\frac{1}{2}$ in. long, $\frac{1}{4}$–$\frac{1}{3}$ in. broad, glabrous, very obtuse, narrowed gradually from the middle to the base, thick and rigid in texture, dull green on both surfaces, the veins quite hidden. Flowers 3–4, quite sessile in the axils of each leaf all down the branch. Persistent bracteoles forming a small cup at the base of each flower. Fruit ovoid, $\frac{1}{6}$ in. in diam., brown, densely beset with round hard papillæ. Segments of the female flower 4, small, deltoid. Stigma nearly sessile.—Bay of St. Augustine, *Bojer*!

VISCUM MULTICOSTATUM, n. sp.

Glabrum, ramulis angulatis multicostatis, foliis oppositis subpetiolatis oblongis sæpissime acutis rigidis obscure trinervatis utrinque viridibus, floribus ad axillas foliorum paucis dense glomeratis sessilibus, singulis bracteolis 2 orbicularibus cuspidatis connatis suffultis, fructu parvo ovoideo sessili valde rugoso stigmate subsessili.

Branchlets woody, greenish, glabrous like the rest of the plant, terete downwards, with many fine ribs, angled and deeply sulcate upwards. Leaves in distant pairs, narrowed to an indistinct short channelled petiole, 2–3 in. long, 1–1$\frac{1}{4}$ in. broad, usually narrowed to an acute point, rarely shorter and obtuse, obscurely triplinerved in the lower third, thick and rigid in texture, bright green. Flowers 3–6 in dense clusters in the axils of all the leaves, quite sessile, each subtended by a pair of minute persistent connate bracteoles. Male flowers $\frac{1}{8}$–$\frac{1}{6}$ in. long, greenish, with 4 deltoid segments. Fruit (immature) ovoid, pale brown, very rugose, the papillæ round or muriform, wavy and confluent,the style very short. —Woods of the province of Imerina, *Baron* 465! 1070! Forest of Andrangaloaka, *Dr. Parker*! Allied to the Abyssinian *V. tuberculatum*, A. Rich., figured in Trans. Linn. Soc. vol. xxix. t. 45.

VISCUM MYRIOPHLEBIUM, n. sp.

Glabrum, ramosissimum, ramulis tetragonis, foliis sessilibus oblongis vel oblongo-lanceolatis acutis rigide coriaceis venulis verticalibus subtilibus exsculptis percursis, floribus 1–3 axillaribus glomeratis, singulis bracteolis 2 minutis connatis suffultis, fructu parvo globoso lævi pedicellato, stylo producto gracili.

A much-branched shrub, glabrous in all its parts, with slender angled sulcate green woody branchlets. Leaves opposite, 1–1½ in. long, ⅓–½ in. broad at the middle, narrowed gradually to both ends, rigid in texture, dull green on both sides, with very fine vertical anastomosing raised veinlets like *Exocarpus* or *Xylophylla*. Flowers 1–3 in the axils of the leaves, each enclosed in a minute green cupule formed by a pair of connate bracteoles. Ovary small, globose, distinctly pedicellate, tipped by a distinct slender style, with a capitate stigma, the dark brown epicarp wrinkled when dry, but not papillose.—Madagascar, *Pervillé* 719! and a variety with smaller leaves and closer branches from the province of Ambongo, *Pervillé* 616!

VISCUM PENTANTHUM, n. sp.

Glabrum, ramulis teretibus multisulcatis, foliis petiolatis ovatis acuminatis rigide subcoriaceis obscure triplinerviis, floribus in umbellas axillares pedunculatas 4–5-floras basi cupulatas dispositis, pedicellis brevibus, ovario oblongo lævi, sepalis 4 deltoideis.

Branches green, slender, woody, multisulcate. Leaves in opposite pairs, shortly petioled, 2–3 in. long, 1–1¼ in. broad, deltoid at the base, narrowed into a long acute point, moderately firm and thick in texture, with three indistinct nerves from the base. Umbels springing from the axils of all the leaves on a short erecto-patent peduncle, the whole umbel springing from a patellæform cupule formed from two connate bracteoles, not with a cupule to each flower as in the other species. Ovary oblong, shortly pedicellate, surmounted by 4 small deltoid connivent segments. Fruit not seen.—Island of Marossi, Antongil Bay, *Bojer*! A near ally of *V. triflorum*, DC.

EXOCARPUS (§ PHYLLODANTHOS) XYLOPHYLLOIDES, n. sp.—Xylophylla ensifolia, *Bojer MSS.*

There can be little doubt, although none of the specimens show either flower or fruit, that a plant of which we have now four sheets at Kew, is a phyllocladioid *Exocarpus* closely allied to the well-known *E. phyllanthoides*, Endl., of Norfolk Island, and a plant from the Malay isles (*E. ceramica*, A. DC. Prod. xiv. 691), founded on a figure of Rumphius. The lower part of the branch is terete; but it passes at the top into an oblanceolate thick rigid phylloclade half a foot long, $\frac{1}{2}$-$\frac{3}{4}$ in. broad, narrowed gradually from the middle to the base, with very fine anastomosing vertical veins, the same on both sides, and margined with teeth about $\frac{1}{2}$ in. apart, indented on the anterior side only. From the sides of primary phylloclades branch out others that are quite similar in shape and texture; and sometimes these are branched again. Dr. Meller gathered it in 1862 in dense woods near Mbatomanga, sixty miles south of the capital; and now Mr. Baron has obtained it (1631) from woods between Tankay and the east coast. The plant is so interesting, from both a systematic and a geographical point of view, that it is to be hoped perfect specimens may soon be obtained. The wood of the tree, Mr. Baron says, is extremely hard.

CEPHALOPHYTON PARKERI, *Hook. fil.*

This is a curious new genus of Balanophoreæ with the habit of a compound Sphæria (say *Hypoxylon multiforme*). It was brought home by Dr. Parker, and is used in the island medicinally. As the specimens are few in number and do not show the male flowers, Dr. Parker has sent for fuller material; and when this arrives Sir J. D. Hooker will characterize the genus.

EUPHORBIA (§ ANISOPHYLLUM) TRICHOPHYLLA, n. sp.

Perennis, dense pilosa, caulibus brevibus profunde dichotome ramosis, foliis breviter petiolatis oppositis parvis orbiculari-oblongis basi obliquis, floralibus reliquis conformibus, involucro axillari solitario campanulato breviter pedunculato, appendicibus 5 patulis orbicularibus integris, fructu globoso pendulo glabro, seminibus lævibus, stylis bifidis.

A perennial herb, much branched from the crown of the root, with very slender stems not more than 2–3 in. long, dichotomously branched from low down. Leaves in pairs on very short petioles; blade $\frac{1}{6}$ in. long, entire, broadly rounded at both ends, moderately firm in texture, pale green, densely clothed on both sides with short white woolly hairs. Involucres solitary from the axils of the upper leaves; peduncle rather longer than the green glabrous campanulate tube, which is $\frac{1}{12}$ in. in diam.; appendages 5, orbicular, thick and fleshy, without teeth or horns. Capsule $\frac{1}{12}$ in. in diam., erect, deeply 3-lobed. Seed oblong, smooth.—Central Madagascar, *Baron* 1803! Allied to *E. scordifolia*, Jacq. Ic. t. 476 (*E. tomentosa*, Pers.).

Euphorbia (§ Tithymalus) ensifolia, n. sp.

Perennis, erecta, glabra, foliis paucis alternis sessilibus rigidis linearibus, paniculæ laxæ ramulis ascendentibus elongatis parce ramosis nullis umbellatis, foliis floralibus parvis lanceolatis, involucro parvo glabro campanulato breviter pedunculato appendicibus patulis late quadratis margine minute cuspidatis, fructu erecto globoso glabro, seminibus lævibus oblongis.

An erect perennial herb, with wiry terete stems about 2 ft. long. Proper leaves few, alternate, sessile, linear, acuminate, rigid in texture, $1\frac{1}{2}$–2 in. long, $\frac{1}{12}$ in. broad. Panicle occupying more than half the length of the stem, with long slightly compound branches, with distant nodes. Floral leaves opposite, lanceolate, acute, $\frac{1}{8}$–$\frac{1}{6}$ in. long. Involucres solitary, with a campanulate tube $\frac{1}{12}$ in. in diam., a short peduncle and 5 spreading quadrate appendages twice as broad as long, obscurely cuspidate at the corners. Fruit globose, erect, glabrous, $\frac{1}{6}$ in. in diam., with a smooth oblong seed in each cell. Styles simple, $\frac{1}{2}$ lin. long, connate in the lower part.—Central Madagascar, *Baron* 2087! A neighbour of the Mauritian *E. dracunculoides*, Lam., figured in Boissier's 'Icones Euphorb.' t. 91.

Euphorbia (§ Tithymalus) emirnensis, n. sp.

Perennis, erecta, glabra, caule gracili, foliis oblanceolatis obtusis uninerviis sessilibus, paniculæ amplæ laxæ ramis ascendentibus parce ramosis 5 superioribus umbellatis, foliis floralibus oppositis suborbicularibus, involucro parvo glabro campanulato breviter pedunculato, appendicibus patulis quadratis margine calcaratis, fructu pendulo globoso glabro, seminibus lævibus oblongis.

A perennial herb, glabrous in all its parts, with slender erect terete green stems. Leaves numerous, ascending, alternate, obtuse, sessile, about an inch long, $\frac{1}{6}$ in. broad, 1-nerved, moderately firm in texture, narrowed gradually from the middle to the base. Panicle lax, erect, nearly a foot long, with several branches below the 5-rayed umbel, the branchlets of which (1–3) are 4–5 in. long. Floral leaves in distant sessile pairs with one involucre each to the upper, orbicular ones, $\frac{1}{4}$–$\frac{1}{2}$ in. in diam., minutely cuspidate. Involucre 1 lin .in diam., with a very short peduncle and 5 spreading quadrate appendages with a short horn from each corner. Fruit glabrous, orbicular, $\frac{1}{8}$ in. in diam. Styles simple, $\frac{1}{3}$ lin. long. Seed oblong, glaucous, smooth, with a small white fleshy caruncula.—Central Madagascar, *Baron* 1813! Allied to the European *E. virgata*, Wald. & Kit.

EUPHORBIA (§ TITHYMALUS ?) ERYTHROXYLOIDES, n. sp.

Fruticosa, glabra, ramulis gracilibus lignosis sub apicem crebre nodulosis, foliis ad apices ramulorum fasciculatis petiolatis ovatis vel oblongis integris membranaceis cuspidatis, involucris ad apices ramorum umbellatis pedunculatis basi foliis 2 obovato-cuneatis stipatis, tubo campanulato, appendicibus 5 crassis erectis rotundatis plus latis quam longis.

A tree, with slender terete flexuose divaricating woody ultimate branchlets, furnished towards the tip with copious crowded raised semilunar scars. Leaves solitary or in small whorls at the tip of the branchlets, on short slender petioles; blade $\frac{1}{2}$–$1\frac{1}{4}$ in. long, acute, deltoid at the base, thin in texture, green and glabrous on both surfaces, all the veins except the midrib indistinct. Involucres 3–8, in whorls from the tips of the branchlets with the leaves, on erect peduncles $\frac{1}{4}$–$\frac{1}{3}$ in. long; tube campanulate, 1 lin. in diam., with 5 broad short rounded thick erect entire appendages and two opposite obovate-cuneate membranous glabrous bracts twice as long as itself. Flowers only seen in a young stage.—Wood near Analamazoatra, *Meller*! Central Madagascar, *Baron* 1223! Near Ampasimpotsy, *Baron* 1621! A very curious species, of which specimens in a later stage are required.

UAPACA DENSIFOLIA, n. sp.

Arborea, glabra, foliis confertis brevissime petiolatis oblanceolato-oblongis obtusis subcoriaceis utrinque viridibus subtiliter venulosis, capitulis masculis globosis pedunculatis bracteis 3–4 oblongis obtusis reflexis glabræ suffultis, perianthio piloso dentibus deltoideis, filamentis quam antheræ globosæ quadruplo longioribus.

A tree, with crowded slender branchlets, glabrous in all its parts. Leaves crowded, alternate, ascending; petiole not more than $\frac{1}{8}$–$\frac{1}{6}$ in. long; blade 1–$1\frac{1}{2}$ in. long, $\frac{5}{8}$–$\frac{3}{4}$ in. broad above the middle, narrowed gradually from the middle to the base, firm in texture, green and minutely glanduloso-punctate on both sides, the fine distant arcuate ascending main veins anastomosing by arches within the margin. Female flowers and fruit not seen. Male flowers in a globose head $\frac{1}{4}$ in. in diam., on a slender peduncle $\frac{1}{2}$–$\frac{3}{4}$ in. long, with 3–4 reflexing glabrous bracts $\frac{1}{4}$ in. long at the base. Perianth infundibuliform, minutely toothed, shorter than the filaments. Stamens $\frac{1}{8}$ in. long.—Central Madagascar, *Baron* 1917! Allied to the Zambesi-land *U. nitida*, Müll. Arg.

CROTON (§ ELUTERIA) EMIRNENSIS, n. sp.

Arborea, ramulis dense breviter stellato-pilosis, stipulis setaceis, petiolis

elongatis apice glandulosis 2 nigris peltatis glabris stipitatis præditis, foliis cordato-orbicularibus acutis serratis integris vel breviter palmatim trilobatis facie viridibus punctis minutis stellato-pilosis scabris dorso dense stellato-pilosis penninerviis reticulato-venulosis, racemis laxis elongatis, floribus masculis multis staminibus circiter 12, fœmineis solitariis ovario dense hispido stylis brevibus multipartitis.

A tree, with slender woody branchlets, densely clothed with short drab stellate hairs. Leaves alternate; petiole 1½–2 in. long, with a pair of deflexed stalked cushion-shaped glands at the top; blade 4–5 in. long and broad, shallowly cordate, irregularly serrated, with 7 veins radiating from the base of the petiole and 3–4 pairs of erecto-patent main branches from the midrib above the base; upper surface green, rough with minute stellate hairy tufts; lower surface covered all over with whitish stellate hairs, the veins and veinlets all raised. Racemes erect, axillary, 5–6 in. long, only the lowest flower female. Male perianth densely pilose. Female calyx ⅓ in. broad when expanded; sepals ovate; petals oblong, as long as the sepals. Fruit ½ in. long and broad, rough with spreading whitish hairs. Styles short, black, with 9 or 10 divisions.—Central Madagascar, *Baron* 1841! 1854! Allied to *C. muricatus*, Vahl.

CROTON (§ EUCROTON) NITIDULUS, n. sp.

C. ramulis gracillimis lignosis ferrugineo-lepidotis, foliis alternis vel oppositis petiolo brevi apice biglanduloso limbo parvo oblongo integro subobtuso subcoriaceo nitidulo obscure lepidoto-punctato, floribus masculis in racemos angustos elongatos dispositis calyce ferrugineo-lepidoto staminibus paucis, floribus fœmineis solitariis calycis segmentis ovatis parce lepidotis, ovario dense lepidoto, stylis brevibus multipartitis.

A tree, with slender woody branchlets, soon denuded, but densely clothed at first with ferruginous lepidote scales. Leaves alternate or opposite. Stipules deciduous; petioles ¼–½ in. long, with a pair of stalked cushion-shaped glands at the top; blade 1½–2½ in. long, moderately firm in texture, finely penninerved, green on both sides, with only a few indistinct lepidote scales, glossy above. Male flowers in dense elongated axillary racemes, seen in bud only. Calyx globose, densely ferrugineo-lepidote. Female flowers solitary, on a long pedicel. Segments of the female calyx finally ⅓ in. long, with only a few scattered scales on the outside. Ovary densely ferrugineo-lepidote; styles short, black, glabrous, multifid.—Central Madagascar, *Baron* 1302! 1349! Allied to *C. Argyrodaphne*, Baill.

CROTON LUTEO-BRUNNEUS, n. sp.

Arboreus, ramulis pilis brevibus luteo-brunneis dense vestitis, foliis longe petiolatis ovatis integris acutis penninerviis facie tenuiter dorso dense stellato-pilosis, floribus fœmineis ignotis, floribus masculis copiosis in racemos laxos elongatos dispositis, bracteis parvis deltoideis, calycis dense pilosi segmentis 3–4 ovatis, petalis abortivis, staminibus circiter 50 quam perianthium brevioribus.

A tree, with terete woody branchlets, densely clothed, as are the petioles, peduncles, pedicels, bracts, and calyx, with short soft yellowish-brown hairs. Leaves alternate; stipules deciduous; petioles $\frac{1}{2}$–$1\frac{1}{2}$ in. long; blade 3–4 in. long, $1\frac{1}{2}$–$2\frac{1}{2}$ in. broad, acute, entire, broadly rounded or subcordate at the base, moderately firm in texture, green and thinly pilose above, densely clothed with pale stellate hairs beneath, the 5–6-jugate arcuate ascending main veins raised. Male flowers in copious lax axillary shortly peduncled racemes 2–4 in. long; pedicels as long as the solitary flowers, the lower ones deflexed. Calyx $\frac{1}{8}$ in. long, of 3–4 ovate segments. Petals none. Stamens in a dense globose mass, with filaments about as long as the anthers.—Central Madagascar, *Baron* 1770! Remarkable by the absence of petals in the male flowers.

ACALYPHA BARONI, n. sp.

Fruticosa, ramulis griseo-pubescentibus, stipulis parvis lanceolatis, foliis petiolatis ovatis acutis serratis membranaceis utrinque pubescentibus, floribus masculis ignotis, floribus fœmineis in spicas axillares 1–3-floras dispositis, bracteis orbicularibus membranaceis hispidis ovarium haud superantibus, stylis profunde multisectis.

A shrub or small tree, with slender terete branchlets, clothed with dense short grey hairs. Leaves alternate; stipules $\frac{1}{8}$ in. long, lanceolate, scariose; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. long, slender, densely pubescent; blade 2–3 in. long, 1–$1\frac{1}{2}$ in. broad, broadly rounded at the base, acute, inciso-crenate, thin in texture, pilose principally on the ribs above, shortly grey-pubescent all over beneath. Female flowers in short-peduncled spikes from the axils of many leaves; rhachis pubescent. Bracts orbicular, wrapped round the ovary, $\frac{1}{12}$ in. long, minutely hispid. Styles 3, yellowish, $\frac{1}{6}$ in. long, cut into very numerous very slender divisions.—Central Madagascar, *Baron* 1725!

ACALYPHA RADULA, n. sp.

Arborea, ramulis dense breviter pubescentibus, stipulis lanceolatis scariosis, foliis breviter petiolatis lanceolatis basi rotundatis denticulatis facie obscure viridibus punctis bullatis scaberrimis dorso venulosis griseo-pubescentibus, floribus masculis in spicas graciles cylindricas aggregatis, floribus fœmineis paucis alternis spicatis bracteis magnis orbicularibus dense glanduloso-pilosis suffultis, ovario glanduloso-piloso, styli ramis laciniatis, seminibus lævibus.

A tree, with slender woody terete branches densely clothed with short grey pubescence. Leaves alternate; stipules brown, membranous, persistent, $\frac{1}{6}$ in. long; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. long, densely pubescent; blade 3–4 in. long, $\frac{3}{4}$–1 in. broad, narrowed gradually from a little above to the base to an acute point, very rough with raised points on the dark green upper surface, densely clothed with short grey pubescence beneath. Male flowers in slender shortly peduncled solitary spikes from the axils of the leaves under an inch long; rhachis and perianth pilose. Female flowers 3–4 in a spaced-out spike from the axils of the leaves. Bracts 1-flowered, orbicular, $\frac{1}{4}$–$\frac{1}{3}$ in. long, densely beset on the edge and back with glandular hairs. Fruit $\frac{1}{8}$ in. in diam., glanduloso-pilose. Seed ovoid, smooth, mottled, $\frac{1}{12}$ in. long.—Central Madagascar, *Baron* 1818!

ACALYPHA LYALLII, n. sp.

Herbacea, perennis, glabra, stipulis caducis, foliis breviter petiolatis magnis oblongis acutis conspicue serratis utrinque viridibus glabris, spicis unisexualibus, floribus masculis in spicas cylindricas axillares dispositis, floribus fœmineis in spicas axillares laxas pedunculatas 1–4-floris dispositis, bracteis unifloris foliaceis 3–4plo plus latis quam longis glabris dentatis, stylis profunde multipartitis.

Apparently a perennial herb, glabrous in all its parts except the youngest branchlets and peduncles, which are shortly pubescent. Leaves distant, alternate, ascending; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. long; blade 4–6 in. long, $1\frac{1}{2}$–2 in. broad, acuminate, conspicuously inciso-crenate, narrowed from the middle to a slightly rounded base, membranous in texture, bright green and glabrous on both surfaces. Male spikes about an inch long, on peduncles from the axils of the lower leaves. Female flowers in short-peduncled spikes from the axils of the upper leaves; bract foliaceous, glabrous, $\frac{1}{4}$ in. long, toothed on the upper edge, completely wrapped round the ovary, above $\frac{1}{2}$ in. broad when unfolded. Ovary lepidote, globose, $\frac{1}{6}$ in. long. Styles $\frac{1}{4}$ in. long, cut into very numerous fine divisions.—Central Madagascar, *Dr. Lyall*!

MACARANGA (§ EUMACARANGA) ECHINOCARPA, n. sp.

Arborea, glabra, foliis brevissime petiolatis oblanceolatis obtusis vel

subacutis rigide coriaceis integris utrinque viridibus subtus reticulato-venulosis, floribus masculis ignotis, floribus fœmineis in cymas copiosas axillares pedunculatas paucifloras dispositis, perianthii parvi segmentis ovatis, ovario globoso glabro dense echinato stylo persistente hispido fructui æquilongo coronato.

A tree, glabrous in all its parts, with slender terete woody branchlets. Leaves crowded, alternate, ascending; petiole $\frac{1}{4}$ in. long; blade 2–3 in. long, about $\frac{1}{2}$ in. broad, narrowed gradually from the middle to the base, quite entire, firm in texture, green on both surfaces, paler beneath, the 7–8-jugate arcuate ascending main veinlets and copious intermediate areolæ all distinctly visible. Female flowers one or few on copious ascending slender glabrous lateral peduncles and distinctly pedicellate. Perianth glabrous, subcoriaceous, $\frac{1}{12}$ in. long. Ovary globose, $\frac{1}{4}$ in. in diam. in the fruiting stage, when it slits down one side from top to bottom, densely beset with brown coriaceous bristles half as long as itself and crowned with 1 rarely 2 cylindrical hispid persistent filiform entire styles. Seed 1, globose, black, glabrous.—Central Madagascar, *Baron* 451! 1779!

MACARANGA ALNIFOLIA, n. sp.

Arborea, glabra, foliis oblongis acutis rigide subcoriaceis utrinque viridibus glabris venis primariis 10–12-jugis erecto-patentibus exsculptis, floribus fœmineis ignotis, floribus masculis in glomerulos globosos paniculatos dispositis, perianthii glabri campanulati segmentis ovatis, staminibus paucis.

A tree, with terete woody branchlets, glabrous in all its parts. Leaves alternate; petiole 1–1$\frac{1}{2}$ in. long; blade 4–5 in. long, 2 in. broad at the middle, quite entire, acute, not acuminate, deltoid at the base, moderately firm in texture, green and quite glabrous on both surfaces, the 10–12-jugate erecto-patent main veins only raised beneath. Male flowers in copious peduncled axillary panicles longer than the petioles, arranged in dense globose clusters, but seen only in the bud-stage. Perianth globose, glabrous.—Central Madagascar, *Baron* 1404! This and the two succeeding species, so far as can be judged from the material, fall in beside *M. boutonioides* and *obovata*; but female flowers are needed to settle their position definitively. *M. cupularis*, Müll. Arg. in DC. Prod. xv. 2, p. 1008, of which the original is at Kew, is identical with a plant distributed by Bojer under the name of *M. ciliata* from Johanna island.

MACARANGA MACROPODA, n. sp.

Arborea, glabra, foliis longe petiolatis oblongis integris acuminatis rigide subcoriaceis utrinque viridibus glabris venis 6–7-jugis ascendentibus, floribus fœmineis ignotis, floribus masculis in glomerulos globosos spicatos vel paniculatos dispositis, perianthii glabri campanulati segmentis ovatis, staminibus 6–8 antheris longe exsertis.

A tree, glabrous in all its parts, with slender woody final branchlets. Leaves alternate; petiole 1½–2 in. long; blade oblong, very acuminate, 3–4 in. long, 1¼–1½ in. broad at the middle, rounded at the base, moderately firm in texture, green and quite glabrous on both surfaces, the 6–8-jugate very ascending main veins only raised. Male flowers in copious axillary spikes or panicles about as long as the petioles, aggregated in dense globose clusters ¼–⅓ in. in diam. Perianth brownish, glabrous, ½ lin. long, cut down nearly to the base into 3–4 ovate segments. Anthers of 4 orbicular pale yellow cells, 4–6 times shorter than the glabrous filaments.—Central Madagascar, *Baron* 1696!

MACARANGA SPHÆROPHYLLA, n. sp.

Arborea, ramulis validis dense brunneo-pubescentibus, foliis longe petiolatis orbicularibus denticulatis conspicue cuspidatis crassis coriaceis facie viridibus subcalvatis dorso dense pilosis reticulato-venulosis, floribus fœmineis ignotis, masculis in glomerulos globosos paucos paniculatos dispositis, perianthii parvi pilosi segmentis deltoideis, staminibus 6–10 antheris breviter exsertis.

A tree with stout terete woody branchlets, densely coated, like the petioles, with persistent short brown pubescence. Leaves alternate; petioles 2 in. or more long, spreading from the branch at a right angle, inserted at the base of the blade; blade deflexed, 4–5 in. long and broad, with a sudden lanceolate cusp, thick and rigid in texture, dark green and nearly glabrous above when mature, densely clothed with persistent short hairs beneath, the 4–5-jugate erecto-patent main veins and parallel cross bars raised and brown. Male flowers in copious shortly peduncled axillary panicles about as long as the petiole, made up of few globose clusters ¼ in. in diam. Rhachis and perianth densely brown-pubescent, the latter campanulate, not above ¼–⅓ in. long and broad. Orbicular 4-celled pale-yellow anthers only just exserted from the perianth.—Central Madagascar, *Baron* 1732!

FICUS (§ UROSTIGMA) MARMORATA, *Bojer inedit.*

Glabra, ramulis gracillimis, stipulis minutis lanceolatis, foliis longe

petiolatis oblongis acutis parvis rigide coriaceis venis subtilibus immersis, receptaculis parvis duris globosis glabris sessilibus vel brevissime pedunculatis basi bracteis 3 minutis orbicularibus suffultis.

A shrub, glabrous in all its parts, with slender subterete branchlets with pale-brown bark. Stipules lanceolate, acute, $\frac{1}{6}$ in. long. Leaves alternate; petiole very slender, $\frac{1}{2}$–$\frac{3}{4}$ in. long; blade 1–1$\frac{1}{2}$ in. long., $\frac{1}{2}$–$\frac{3}{4}$ in. broad at the middle, acutely cuspidate, deltoid or rather rounded at the base, rigid but thin in texture, green on both surfaces, the veins beneath fine, immersed and indistinct, anastomosing in intramarginal arches. Receptacles copious, arising from the leafy branchlets, $\frac{1}{2}$ in. in diam., with a hard shell, subtended at the base by 3 orbicular bracts, generally at the top of a very short peduncle, quite filled up inside by the fruits. Achene subglobose, glossy, pale brown, with about 4 chestnut-brown lanceolate perianth-segments.—Bay of St. Augustine, *Bojer*!

FICUS (§ UROSTIGMA) MELLERI, n. sp.

Glabra, ramulis gracilibus, stipulis parvis lanceolatis, foliis breviter petiolatis oblanceolato-oblongis obtusis basi rotundatis rigide coriaceis venulis faciei inferioris crebris subtilibus exsculptis, receptaculis parvis sessilibus glabris globosis, basi bracteis 3 orbicularibus minutis præditis.

A tree 15 feet high, glabrous in all its parts, with slender branchlets, and dark brown bark. Stipules lanceolate, acute, $\frac{1}{6}$ in. long. Leaves alternate; petiole stout, $\frac{1}{4}$–$\frac{1}{2}$ in. long.; blade 2–2$\frac{1}{2}$ in. long, $\frac{3}{4}$ in. broad above the middle, obtuse, shortly rounded at the base, thick and rigid in texture, green on both sides, the close, fine, distinctly raised erecto-patent veins and veinlets connected by an intramarginal nerve. Receptacles copiously produced from the leafy branchlets, sessile, pale brown, $\frac{1}{4}$ in. in diam.; subtended by three small orbicular bracts connate at the base. Achene shining, pale brown, with a filiform style and about 4 lanceolate reddish-brown perianth-segments.—Tranomaro, between Tamatave and Antananarivo, *Dr. Meller*! Central Madagascar, *Baron* 515! 1015! *Gerrard* 31! *Lyall* 150! Forest of Alamazaotra, *Baron* 1409! 1466! Fruit edible. Native name "Nonok." A near ally of the Mauritian *F. pyrifolia*, Lam.

FICUS (§ UROSTIGMA) SOROCEOIDES, n. sp.

F. **ramulis gracillimis hispidis, stipulis minutis lanceolatis, foliis breviter petiolatis oblongis cuspidatis basi rotundatis subcoriaceis utrinque viridibus facie nitidulis dorso punctis elevatis scabris venis patulis exsculptis,**

receptaculis parvis globosis pilosis breviter pedunculatis basi minute bracteatis.

A much-branched tree, with very slender branchlets, rough with short ascending bristly hairs. Stipules minute, lanceolate. Leaves contiguous, alternate; petiole $\frac{1}{8}$ in. long; blade 1–1$\frac{1}{2}$ in. long, $\frac{1}{2}$ in. broad, obtusely cuspidate, broadly rounded at the base, firm and rigid in texture, bright green and glossy above, pale green beneath, rough with raised points, the distinct spreading pale raised 5–6-jugate main veins anastomosing distinctly just within the edge. Receptacles few, green, globose, pilose, produced from the slender leafy branches, shortly peduncled, subtended by 3 minute deltoid bracts at the base.—Central Madagascar, *Baron* 1014!

FICUS (§ UROSTIGMA) LONGIPES, n. sp.

Glabra, ramulis gracillimis, stipulis minutis lanceolatis, foliis longe petiolatis oblongis conspicue cuspidatis modice firmis, venulis primariis 5–6-jugis exsculptis arcuatis, receptaculis parvis globosis glabris pedunculatis, pedunculis medio minute bracteatis.

A tree, glabrous in all its parts, with very slender ultimate branchlets. Stipules acuminate, $\frac{1}{8}$–$\frac{1}{6}$ in. long. Leaves alternate; petioles very slender, scabrous, $\frac{1}{2}$–$\frac{3}{4}$ in. long; blade 1$\frac{1}{2}$–2$\frac{1}{2}$ in. long, about an inch broad at the middle, furnished with a conspicuous lanceolate cusp $\frac{1}{4}$–$\frac{1}{3}$ in. long, deltoid at the base, moderately firm and thick in texture, bright green and glabrous on both surfaces, with 5–6 pairs of arcuate ascending main veins anastomosing just within the edge, the other veinlets fine, immersed, and indistinct. Receptacles produced from the leafy branches, glabrous, globose, firm in texture, $\frac{1}{6}$ in. in diam. Peduncle $\frac{1}{8}$ in. long, with 3 minute bracts at the middle. Achenes whitish, globose, with 3–4 pale lanceolate perianth-segments. Style elongated.—Central Madagascar, *Baron* 1948!

FICUS (§ UROSTIGMA) BRACHYCLADA, n. sp.

F. ramulis gracilibus teretibus hispidis, stipulis parvis lanceolatis, foliis breviter petiolatis oblongo-lanceolatis cuspidatis basi deltoideis subcoriaceis facie scabris dorso dense pilosis venis multis exsculptis, receptaculis globosis parvulis scabris distincte pedunculatis, pedunculis medio bracteis tribus minutis præditis.

A tree, with slender terete branchlets, very rough with short spreading bristles. Stipules lanceolate, $\frac{1}{4}$ in. long. Leaves alternate; petiole about $\frac{1}{2}$ in. long, densely pilose; blade 6–8 in.

long, 1½–2 in. broad, with a large lanceolate cusp and a few indistinct teeth at the apex, rounded at the base, moderately firm in texture, dark green and rough with short bristly hairs above, pale green and densely pilose beneath, the distant arcuate ascending main veins, which anastomose in arches just within the margin, distinctly raised, and the intermediate veinlets less distinctly. Receptacles 1–3nate, from the slender leafy branches, pale brown, globose, ⅓ in. in diam., rough with short bristly hairs. Achenes obovoid, pale brown, glossy, with 3–4 lanceolate perianth-segments and a filiform style.—Central Madagascar, *Baron* 1100!

FICUS (§ UROSTIGMA) XIPHOCUSPIS, n. sp.

F. ramulis gracillimis hispidis, stipulis parvis lanceolatis, foliis breviter petiolatis oblanceolatis longe cuspidatis subcoriaceis venis primariis exsculptis, receptaculis globosis parvis sessilibus vel brevissime pedicellatis bracteis minutissimis.

A tree, with very slender branchlets, rough with short ascending bristly hairs. Stipules pale brown, ⅛ in. long. Leaves alternate; petiole ¼–½ in. long, very scabrous; blade 3–6 in. long, ¾–1 in. broad, with a lanceolate cusp ½–1 in. long, rounded at the base, subcoriaceous, glabrous on both surfaces, dark green above, pale green beneath, with 6–9 pairs of arcuate ascending main veins connected by a pair that run up from the base of the midrib just within the margin. Receptacles globose, pale brown, ¼ in. in diam., produced from the slender leafy branchlets. Achenes globose, nearly white, with about 4 lanceolate perianth-segments and an elongated style.—Between Tankay and the east coast, *Baron* 1554! 1646!

FICUS (§ UROSTIGMA) CLAOXYLOIDES, n. sp.

F. ramulis gracillimis hispidis, stipulis parvis lanceolatis, foliis breviter petiolatis oblongis conspicue cuspidatis basi deltoideis modice firmis utrinque viridibus glabris venis primariis arcuatis distantibus solum exsculptis, receptaculo parvo glabro globoso breviter pedunculato, pedunculis medio bracteis tribus minutis præditis.

A tree, with slender brown branchlets, very rough with short ascending bristly hairs. Stipules brown, lanceolate, under ¼ in. long. Leaves alternate; petiole very short; blade 2–4 in. long, 1–1¾ in. broad, with a distinct lanceolate cusp ¼–½ in. long at the tip, subcoriaceous in texture, quite glabrous, dark green above, pale green beneath, with few distant ascending pale main veins, connected by a pair that run up from near the base of the midrib all along just within the margin. Receptacles globose, glabrous, $\frac{1}{4}$ in. in diam., produced from the slender leafy branches on ascending peduncles $\frac{1}{8}$–$\frac{1}{6}$ in. long, with 3 minute bracts about the middle. Achenes glossy, pale brown. Female perianth with 3–4 lanceolate segments. Style filiform, elongated.—Forests of Central Madagascar, *Baron* 1074! Top of Ifody Mountain, *Baron* 1374! Andrangaloaka, *Dr. Parker*! Native name, "Ki Vozo."

FICUS (§ UROSTIGMA) TRICHOPODA, n. sp.

F. ramulis validis apice pubescentibus, stipulis ovato-lanceolatis, petiolo elongato piloso, foliis magnis ovatis subobtusis rigide coriaceis facie glabris dorso obscure pilosis venis primariis ascendentibus solum exsculptis, receptaculo duro globoso parvo pedunculato basi bracteis 3 orbicularibus suffulto.

A tree, with the ultimate branchlets $\frac{1}{4}$–$\frac{1}{3}$ in. thick, terete, with pale brown bark, shortly pubescent towards the tip. Stipules about $\frac{1}{2}$ in. long. Leaves alternate; petiole $1\frac{1}{2}$–2 in. long, shortly densely pubescent; blade half a foot long, 3–4 in. broad, subobtuse, broadly rounded at the base, rigidly coriaceous, glabrous and rather glossy above, pale and obscurely pubescent beneath, with 8–9 pairs of erecto-patent fine main veins which anastomose in arches just within the margin. Receptacles 1–2-nate, on short stout pubescent peduncles, globose, $\frac{1}{4}$–$\frac{1}{3}$ in. in diam., clasped at the base by 3 orbicular bracts $\frac{1}{12}$ in. in diam. Achene ovoid, with 3–4 pale brown lanceolate perianth-segments and a long style.—Central Madagascar, *Baron* 1655! 1663!

FICUS (§ UROSTIGMA) TRICHOSPHÆRA, n. sp.

F. ramulis validis apice pubescentibus, stipulis ovatis cuspidatis, petiolo elongato, foliis oblanceolato-oblongis magnis rigide coriaceis subobtusis basi deltoideis vel breviter rotundatis utrinque glabris venis primariis erecto-patentibus exsculptis, receptaculis globosis sessilibus dense pilosis bracteis 3 magnis orbicularibus suffultis.

A tree, with rugose branchlets $\frac{1}{4}$–$\frac{1}{3}$ in. in diam., pubescent towards the tip. Stipules about $\frac{1}{2}$ in. long, rigid in texture, pilose on the back. Leaves alternate; petiole 1–$1\frac{1}{2}$ in. long; blade 6–8 in. long, $2\frac{1}{2}$–3 in. broad, rigid in texture, green and glabrous on both surfaces, with 6–8 pairs of erecto-patent raised main veins anastomosing by distinct arches within the margin. Receptacles globose, sessile, $\frac{1}{2}$ in. in diam., densely pilose, furnished at the base with 3 large orbicular bracts. Achene brown, globose, with 3–4 lanceolate perianth-segments and a filiform style.—Central Madagascar, *Baron* 1682! A near ally of *F. Baroni*.

FICUS (§ UROSTIGMA) BARONI, n. sp.

F. ramulis validis glabris rugosis, stipulis magnis ovatis cuspidatis dorso pilosis, petiolo elongato facie plana canaliculata, foliis magnis oblanceolato-oblongis subobtusis basi deltoideis rigide coriaceis utrinque glabris venis primariis erecto-patentibus exsculptis, receptaculo magno duro sessili globoso, bracteis 3 magnis orbicularibus stipato.

Branchlets $\frac{1}{3}$ in. in diam., with glossy brown bark, rough with many channels. Stipules $\frac{1}{2}$ in. long, rigid in texture. Leaves close, alternate; petiole 1–1$\frac{1}{2}$ in. long, with a deeply channelled flat face; blade like that of *Prunus Laurocerasus* in size, shape, and texture, 6–8 in. long, 2–3 in. broad, subacute, narrowed very gradually to the base, furnished with 8–9 erecto-patent main ribs, anastomosing by fine intramarginal arches. Receptacles crowded, sessile, depresso-globose, glabrous, coriaceous in texture, $\frac{1}{2}$ in. in diam., the rigid brown basal bracts $\frac{1}{4}$ in. long and broad. Achene pale brown, with 3–4 whitish lanceolate perianth-segments and a filiform style.—Central Madagascar, *Baron* 1683!

FICUS (§ SYCOMORUS) POLYPHLEBIA, n. sp.

F. ramulis gracilibus hispidis, stipulis magnis lanceolatis acuminatis, foliis breviter petiolatis oblanceolato-oblongis subobtusis basi rotundatis modice firmis utrinque glabris venis permultis subtilibus immersis, receptaculis ad ramos crassos efoliatos productis confertis breviter pedunculatis globosis majusculis pilosis.

A much-branched tree, with slender terete pilose ultimate branchlets. Stipules $\frac{1}{2}$ in. long. Leaves alternate, crowded towards the tip of the branchlets; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. long, stout, densely pilose; blade 3–4 in. long, 1–1$\frac{1}{2}$ in. broad, subobtuse, rounded at the base, moderately firm in texture, dark green above, pale green beneath, glabrous except the midrib, with 6–8 pairs of slightly raised ascending main veins connected by fine anastomosing veinlets just within the margin and very numerous visible intermediate fine immersed veinlets. Receptacles produced in clusters from the stout leafless old branches on short rugose peduncles, $\frac{1}{2}$ in. in diam., rugose, mamillate at the apex, filled up with the fruits. Achenes shining, globose, dark brown. Style filiform.—Banks of rivers Imerina forest, Tankay and Betsimiaraka, *Baron* 1582!

TREMA (§ SPONIA) GRISEA, n. sp.

Arborea, polygamo-dioica, ramulis dense pubescentibus, foliis oblongo-lanceolatis acuminatis basi inæqualibus subtiliter serratis subcoriaceis facie viridibus scabris dorso albido-tomentosis venulis exsculptis, floribus masculis axillaribus dense glomeratis, pedicellis brevissimis, perianthii segmentis 5 oblongis margine albidis fimbriato-villosis.

A tree, with slender terete woody densely pubescent branchlets. Leaves alternate, distinctly petioled, 2–3 in. long, an inch broad, rounded at the base, cordate on one side, finely regularly serrated, rather firm in texture, dark dull green and obscurely pilose above, whitish and densely tomentose beneath, the very ascending veins raised. Male flowers in dense globose clusters in the axils of the leaves all down the branch; peduncles densely villose. Perianth globose, under 1 lin. in diam.; segments 5, oblong navicular, ½ lin. long, with white densely villose edges. Stamens 5, included, surrounding a densely pilose rudimentary ovary.—Central Madagascar, *Baron* 1717!

OBETIA MORIFOLIA, n. sp.

O. ramulis crassis, foliis cordato-orbicularibus late crenatis facie scabris dorso albido-velutinis integris vel sursum leviter trilobatis, paniculis laxis rhachibus setis pellucidis deflexis parcis horridis, perianthii fœminei segmentis orbicularibus inæqualibus.

A tree, with ultimate branchlets woody, ¼ in. in diam., with glabrous brown bark, the leaves crowded at the tip of the branchlets, with large persistent brown ovate membranous stipules and the axillary panicles spreading at right angles from the branch below the leaves. Petioles 1½–3 in. long, armed with deflexed pellucid bristles; blade orbicular, acute, 4–6 in. long, broad, deeply cordate, strongly crenate, entire or shallowly palmately 3-lobed in the upper half, dark green and scabrous with raised points and a few short bristles above, matted beneath all over with persistent whitish thin velvety tomentum. Female panicles 3–4 in. long, with very slender branches armed with sparse deflexed pellucid bristles. Flowers in small spaced clusters, many sterile. Perianth-segments orbicular, greenish-brown, $\frac{1}{12}$ in. in diam.—Forests of the province of Imerina, gathered long ago by Bojer, and now refound by *Baron* 1820! Bojer's specimen in the Kew collection was seen by Dr. Weddell and marked by him "*O. ficifolia*, Gaudich.;" but he does not mention it in the 'Prodromus;' and it seems to be quite distinct specifically from the

Bourbon plant, which has no stinging bristles. Native name "Amiana," common probably to this and the other stinging tree nettles of the island.

OBETIA PINNATIFIDA, n. sp.

O. ramulis crassis, foliis magnis cordato-orbicularibus irregulariter crenatis profunde pinnatifidis segmentis lobatis facie scabris dorso albido-velutinis, paniculis laxis rhachibus setosis, perianthii fœminei segmentis orbicularibus valde accrescentibus.

A tree, with a habit just like that of *O. morifolia*, the branchlets as thick as a man's little finger, the leaves crowded at the top, with large persistent ovate dark brown scariose stipules. Petioles 3–4 in. long, densely armed with deflexed pellucid stinging bristles. Leaves sometimes above a foot broad and nearly as long, deeply cordate at the base, deeply pinnatifid, and the primary segments again deeply lobed, the marginal crenations large and coarse, the upper surface dark green and very rough, the lower matted just as in *O. morifolia* with thin whitish velvety tomentum. Panicles very compound, half a foot or more long, the slender rhachises and short peduncles sparsely armed with deflexed stinging bristles. Flowers in dense spaced clusters. Female perianth of 4 orbicular accrescent greenish-brown segments $\frac{1}{12}$ in. broad. Fruit ovoid, lenticular, greenish, $\frac{1}{2}$ lin. long and broad.—Central Madagascar, *Baron* 1729 ! 1822 !

OBETIA LACINIATA, n. sp.

O. ramulis crassis, foliis profunde bipinnatifidis segmentis angustis profunde crenatis facie scabris dorso dense breviter pilosis, paniculis laxis rhachibus setis pellucidis densis armatis, perianthii masculi globosi segmentis 5 oblongis.

A tree, with exactly the habit of the two other species. Stipules ovate, scariose, persistent, cuspidate, $\frac{1}{2}$ in. long. Petioles about 2 in. long, densely grey-puberulent and densely armed with pellucid stinging bristles. Leaves 5–6 in. long and broad, cut down to a short distance from the midrib and the segments again deeply pinnatifid, acuminate, coarsely serrated, the upper surface dark dull green and scabrous with short bristly hairs, the lower densely pilose, the midrib of the segments densely armed with stinging bristles. Panicle oblong-deltoid, decompound, half a foot long, the slender rhachises densely armed with bristles. Male perianth orbicular, $\frac{1}{12}$ in. in diam., with 5 oblong greenish segments. Stamens 5, surrounding a rudimentary ovary.—Central

Madagascar, *Baron* 1721! Andrangaloaka, *Dr. Parker*! This comes so near the Betsileo-land *Urera Radula*, Baker in Journ. Linn. Soc. xviii. p. 279, that there is little room for doubt that, although the characteristic female flowers are still unknown, this also is an *Obetia*. The four Madagascar Obetias here indicated differ mainly in armature and leaf-cutting, and may possibly prove to be four varieties of one variable species.

URERA OLIGOLOBA, n. sp.

Fruticosa, dioica, ramulis setis pellucidis crebris armatis, foliis magnis longe petiolatis obovatis membranaceis dentatis dimidio superiore lobatis, paniculis axillaribus magnis laxis, floribus fœmineis perianthii segmentis parvis inæqualibus, fructu ovoideo-lenticulari, stigmate magno penicillato, floribus masculis glomeratis perianthii segmentis 5 ovatis.

An erect shrub, the branchlets much more slender than in the Obetias, densely armed towards the top with pellucid stinging bristles. Stipules oblong, brown, scariose, $\frac{1}{3}$ in. long. Leaves alternate, not close; petiole $1\frac{1}{2}$–2 in. long, densely armed with stinging bristles; blade 4–6 in. long, $3\frac{1}{2}$–4 in. broad, membranous, dark green on both sides, with a few bristles, coarsely dentate, shallowly lobed in the upper half. Panicles of both sexes axillary, lax and ample. Male flowers clustered, green, depresso-globose, 1 lin. in diam., with 5 segments and 5 stamens. Female flowers corymbose, shortly pedicellate, with very small perianth-segments, an obliquely ovoid-lenticular ovary, and a conspicuous brownish sessile penicillate stigma.—Forests of the province of Imerina, *Baron* 1923! *Dr. Parker*!

PILEA MODESTA, n. sp.

Annua, dioica, caule brevi inermi gracillimo simplici, foliis paucijugis petiolatis late ovatis membranaceis grosse inciso-crenatis setis paucis pellucidis ad faciem præditis supremis quaternis reliquis oppositis, floribus fœmineis in cymam unicam densam terminalem sessilem aggregatis, perianthii segmentis parvis oblongis inæqualibus, ovario ovoideo-lenticulari.

Stems very slender, simple, erect, not more than 3–4 in. long, quite without hairs or bristles. Nodes about four, the terminal one bearing 4 sessile or nearly sessile unequal leaves, the others two each on longer petioles. Stipules large, ovate, green, membranous, persistent. Leaves an inch long and nearly as broad, deeply crenate, obtuse, very thin in texture, dark green, with a few pellucid bristles on the upper surface. Female flowers in a dense sessile terminal cyme, with 4 very short branches. Achene ovate-lenticular, ½ lin. long, the perianth-segments not more than half its length.—Central Madagascar, *Baron* 907! Nearly allied to *P. tetraphylla*, Blume.

PILEA MACRODONTA, n. sp.

Annua, dioica, caule subinermi elongato gracillimo, foliis oppositis longe petiolatis ovatis acuminatis grosse inciso-crenatis membranaceis, floribus utriusque sexus in glomerulos globosos axillares dispositis, perianthii masculi segmentis ovatis cuspidatis, achenio ovoideo-lenticulari piloso.

An annual, with erect simple very slender unarmed stems a foot long. Leaves opposite; stipules persistent, ovate, brown, membranous, ½ in. long; petiole 1–2 in. long, very slender; blade 2–3 in. long, broad, ovate, cuspidate, deeply inciso-crenate, very thin and membranous in texture, dark green, with a very few obscure pellucid bristles. Flowers of both sexes in globose clusters in the axils of many of the leaves. Male flower globose, under 1 lin. in diam., with 4 stamens and 4 ovate cuspidate segments. Achene ovoid or obovoid, lenticular, obscurely pilose, under a line long, its perianth-segments irregular in shape and size, obtuse or cuspidate.—Shaded woods of the province of Imerina, *Baron* 1058! Forest of Andrangaloaka, *Dr. Parker*! A near ally of *P. hypnophila*, Baker.

PILEA LONGIFOLIA, n. sp.

Glabra, perennis, inermis, dioica, caule simplici elongato, foliis subsessilibus lanceolatis acuminatis argute serratis membranaceis, cymis glomeratis axillaribus breviter pedunculatis, perianthii masculi segmentis 4 oblongis, pedicellis flori æquilongis.

A perennial herb, entirely destitute of hairs and stinging bristles, with long simple elongated erect stems. Leaves in distant pairs, nearly sessile, lanceolate, erecto-patent, 4–6 in. long, ⅝–1 in. broad at the middle, very acuminate, narrowed to the base, membranous, dark green, with close sharp regular erecto-patent teeth. Male flowers only seen, in small clusters from the axils of the leaves all down the branch on short slender ascending peduncles. Flower globose, 1 lin. in diam., with 4 oblong glabrous segments. Stamens 4, the reduplicate flat filament longer than the oblong anther.—Central Madagascar, *Baron* 1912! A well-marked very distinct species.

MYRICA PHILLYREÆFOLIA, n. sp.

M. ramulis pilosis, foliis petiolatis oblongis vel oblongo-lanceolatis integris vel parce dentatis rigide coriaceis glabris, spicis masculis sessilibus 1–2-nis cylindricis densis quam folium brevioribus, bracteis orbicularibus obtusis ciliatis flori æquilongis, staminibus 4 antheris orbicularibus filamentis productis basi coalitis.

A much-branched shrub or small tree, with slender woody finely pilose branchlets. Leaves crowded, nearly sessile, 1–1½ in. long, about ½ in. broad, obtuse, cuneate at the base, usually entire, rarely with a few obscure teeth, rigid in texture, green on both surfaces, with a reddish midrib and fine arcuate ascending pinnate side veins. Male flowers in copious ascending solitary or geminate dense-flowered sessile spikes from the axils of the leaves, ¾–1 in. long. Bracts brown, ovate, rigid, obtuse, ½ lin. long, ciliated on the edge. Anthers 4, orbicular, bifid both at top and bottom, with slender filaments about as long as the anther, united towards the base. Female flowers and fruit not seen.—Forests of the province of Imerina, *Baron* 1379!

MYRICA BOJERIANA, n. sp.—M. salicifolia, *Bojer, inedita, nec Hochst.*

M. ramulis pilosis, foliis petiolatis lanceolatis integris subcoriaceis utrinque minute lepidotis, spicis in exemplis visis androgynis, bracteis ovatis, staminibus 4, antheris orbicularibus filamentis brevissimis.

A much-branched erect shrub or small tree, with slender woody shortly pilose branchlets. Leaves alternate, moderately close; petiole very short; blade 2–3 in. long, ⅓–½ in. broad at the middle, acute or subacute, narrowed very gradually to the base, rather firm in texture, green above, brownish beneath, with obscure minute lepidote scales. Spikes in the specimens seen solitary, cylindrical, about ½ in. long, sessile, ascending, androgynous, with male flowers below and imperfect female ones above. Bracts ovate, brown, scariose, about ½ lin. long. Stamens 4, with orbicular anthers and very short filaments.—Central Madagascar, *Bojer*! Both these two new species are closely allied to *M. spathulata*, Mirbel, of which we have copious specimens from Central Madagascar, gathered by Bojer, Lyall, Meller, and Baron. The latter has gathered it lately (1474!) in the forest of Alamazaotra, where it forms a tree 30 feet high.

FLORIDEÆ.

BURMANNIA MADAGASCARIENSIS, n. sp.

B. caule gracillimo 1–4-floro, foliis 3–4 minutis alternis lanceolatis, floribus cymosis terminalibus sessilibus lateralibus breviter pedicellatis, bracteis minutis lanceolatis, perianthii cærulei trialati obovati tubo cylindrico ovario subæquilongo, limbi segmentis brevibus, exterioribus orbicularibus, interioribus lanceolatis.

Stems filiform, flexuose, 4–5 in. long, with about four alternate sheathing leaves in the lower half, with a small erect lanceolate acute membranous lamina. Flowers cymose, the central flower of the cyme sessile, the side ones on short arcuate ascending pedicels. Perianth blue, $\frac{1}{6}$ in. long, $\frac{1}{6}$ in. in diam. including the three wings, which are nearly truncate at the top, rounded on the outside and narrowed gradually from near the top down to the base; tube cylindrical, about as long as the ovary. Limb very minute, the three outer segments orbicular, the three inner lanceolate. Style as long as the perianth-tube; stigma capitate. Stamens 3, inserted at the top of the perianth-tube just below the large outer segments.—Madagascar, *Gerrard* 101! Central Madagascar, *Baron* 1049! Swampy ground on the east coast, *Baron* 1561! This is doubtless the plant on which Thouars founded his genus *Maburnia*, Nov. Gen. Madag. p. 4; but he describes the stamens as opposite the inner segments of the perianth. It is nearly allied to *B. juncea*, Soland., and *B. cœlestis*, D. Don.

HEDYCHIUM FLAVESCENS and H. PEREGRINUM.

From living roots presented to Kew by Dr. Parker two species of *Hedychium* have been raised, one identical with the Indian *H. flavescens*, Carey, and the other a new species, which has been described by my colleague Mr. N. E. Brown in the 'Gardeners' Chronicle' for March 24, 1883 (p. 368), under the name of *H. peregrinum.*

ARISTEA CLADOCARPA, n. sp.

Dense cæspitosa, glabra, foliis basalibus 8–10 linearibus multinervatis, racemo simplici vel composito rhachi applanata nodis 2–3-floris, bracteis minutis ovatis membranaceis, fructu cylindrico.

Densely cæspitose. Leaves rigid in texture, 4–12 in. long, $\frac{1}{6}$ in. broad, tapering to a point, quite flat on the faces, with above twenty close distinct ribs. Stem, including inflorescence,

$\frac{1}{2}$–1 ft. long, distinctly flattened and winged from the very base, the peduncle furnished with 1–2 sheathing leaves with a short free lamina. Racemes sometimes simple with only a couple of nodes, in luxuriant plants 4–5 in. long, with 1 or 2 short branches and a single terminal node. Nodes 2–3-flowered, sometimes viviparous. Bracts ovate, brownish, membranous, not more than $\frac{1}{12}$–$\frac{1}{8}$ in. long. Flowers with a pedicel as long as the bract, a clavate ovary $\frac{1}{6}$ in. long, and a limb of blue oblanceolate segments scarcely longer than the ovary. Capsule black, glabrous, $\frac{1}{2}$ in. long, with very numerous small turgid superposed seeds in each cell.—Andrangaloaka, along sides of paths and in more open parts of forest, *Dr. Parker*! (one specimen with a tuft of distichous leaves 4–5 in. long from one of the lower nodes of the raceme). Central Madagascar, *Baron* 480! 1092! 1777! Gathered also by the Rev. Deans Cowan.

ARISTEA ANGUSTIFOLIA, n. sp.

Glabra, dense cæspitosa, foliis basalibus circiter 3 lineari-subulatis rigidis, racemo simplici laxissimo nodis 2–3-floris rhachi compressa haud alata, bracteis parvis ovatis membranaceis, fructu oblongo.

A densely cæspitose perennial herb, glabrous in all its parts, with densely tufted wiry root-fibres 3–4 in. long. Basal leaves about three to a flower-stem, a foot long, not more than $\frac{1}{2}$ line broad, stiffly erect, with both faces rather convex. Peduncle (exclusive of raceme) rather longer than the leaves, slender, subterete, with about 4 sheathing leaves, the lowest with a long free lamina, that of the upper ones very short. Raceme simple, half a foot long, with a slightly compressed slender axis, and 5–6 nodes bearing 2–3 flowers each. Bracts ovate or oblong, quite membranous, $\frac{1}{6}$–$\frac{1}{4}$ in. long. Ovary oblong, with a very short pedicel, not seen fully developed. Perianth bright blue, $\frac{1}{2}$ in. long. Stamens not half as long as the perianth.—Central Madagascar, *Baron* 1805!

ARISTEA KITCHINGII, n. sp.

Glabra, cæspitosa, foliis basalibus 6–10 rigidis linearibus 1$\frac{1}{2}$–2-pedalibus multinervatis, racemo elongato composito, rhachi tereti, nodis 5–6-floris, bracteis parvis ovatis membranaceis, fructu oblongo pedicellato.

Densely tufted, with copious slender wiry root-fibres. Leaves erect, very rigid in texture, 1$\frac{1}{2}$–2 ft. long, with very numerous close distinct ribs. Peduncle about 2 ft. long below the inflorescence, terete, with about 4 sheathing leaves, the lower with a long, the upper with a short erect free point. Panicle sometimes above a foot long, with 1–4 short ascending branches with a cluster of flowers at the summit only. Flowers often 5–6 to a node. Bracts brown, membranous, ovate, $\frac{1}{6}$ in. long. Flowers with a small oblong ovary, a bright blue limb $\frac{1}{2}$ in. long with oblong segments $\frac{1}{4}$ in. broad and stamens half as long as the segments. Capsule $\frac{1}{3}$ in. long, rigid in texture, nearly black, with numerous small superposed seeds in each cell.—Ankaratra Mountains, *Kitching*! Central Madagascar, *Baron* 1084! 1731! 1833! Very near *A. madagascariensis*, Baker, from which it differs in its much more robust habit, long leaves, compound inflorescence, and small membranous bracts.

CRINUM (§ STENASTER) FIRMIFOLIUM, n. sp.

C. foliis anguste loratis firmulis tripedalibus margine et facie glabris, scapo modice robusto, umbellis paucifloris, ovario sessili, tubo 5–6-pollicari, limbi segmentis linearibus patulis quam tubus duplo brevioribus, staminibus quam limbus paulo brevioribus.

Leaves narrow lorate, as thick in texture as in any species of the genus, 3 ft. long, $1\frac{1}{2}$ in. broad at the middle, narrowed gradually from the middle to the apex, the veins very close, numerous and immersed. Peduncle moderately stout, under a foot long. Flowers 5–6 in an umbel, sessile, bracteated by two lanceolate spathe-valves $1\frac{1}{2}$ in. long. Perianth-tube 5–6 in. long; segments of the limb linear with recurved edges, $2–2\frac{1}{2}$ in. long, $\frac{1}{4}$ in. broad, spreading widely when fully expanded. Filaments erecto-patent, very slender, 2 in. long; anthers $\frac{1}{2}$ in. long.—East coast, in a freshwater stream, near its mouth, *Baron* 1638! A well-marked new species of the *C. asiaticum* group.

CRINUM (§ STENASTER) LIGULATUM, n. sp.

C. foliis anguste loratis 3–4-pedalibus margine et facie glabris crebre nervatis, scapo robusto, umbellis 20–30-floris, ovario cylindrico sessili, perianthii tubo 2–3-pollicari, segmentis lanceolatis quam tubus brevioribus, staminibus quam limbus distincte brevioribus.

Leaves strap-shaped, 3–4 ft. long, 2 in. broad, moderately firm in texture, closely distinctly ribbed, glabrous both on the surfaces and margin. Peduncle stout, about a foot long. Flowers 20–30 in a dense umbel, subtended by two green lanceolate deltoid spathe-valves about 3 in. long. Flowers sessile or very nearly so; ovary cylindrical, $\frac{3}{4}$–1 in. long; perianth-tube slender, $2\frac{1}{2}$–3 in. long; segments ascending, linear, $1\frac{1}{2}–2\frac{1}{4}$ in. long, $\frac{1}{6}$ in. broad, cuspidate at the tip. Filaments not more than two thirds as long as the perianth-segments; anthers linear, $\frac{1}{2}$ in. long.—Central Madagascar, *Baron* 1982! Allied to *C. asiaticum*, L.

DIOSCOREA HETEROPODA, *Baker in Trimen's Journ.* 1882, p. 270. Female flowers in lax solitary shortly peduncled axillary nearly spicate racemes, finally 3–4 in. long, with a pilose rhachis distinctly winged towards the top, Flowers solitary, erect, with a very short pedicel with a small lanceolate-deltoid bract at the base, a pilose clavate-trigonous ovary $\frac{1}{8}$ in. long, and 6 small ovate perianth-segments. Capsule pendulous, cernuous, shortly pedicellate, obovate-oblong, glabrous, $\frac{3}{4}$ in. long, rounded at both ends, under $\frac{1}{2}$ in. broad. Central Madagascar, *Baron*!

DIOSCOREA TRICHANTHA, n. sp.

D. ramulis gracillimis pilosis, foliis petiolatis simplicibus cordato-ovatis cuspidatis membranaceis obscure pilosis, racemis masculis 2–3nis laxis elongatis, bracteis deltoideo-cuspidatis, floribus parvis pilosis sæpe 2–3nis, racemis fœmineis solitariis, floribus singulis, capsula cernua obovato-oblonga glabra.

An herbaceous twiner, with slender finely pilose stems. Petiole an inch or more long; blade 3–4 in. long, conspicuously cordate, with 7 ribs radiating from the tip of the petiole, thin in texture, green and obscurely pilose on both sides. Male racemes shortly peduncled, 2–3 in. long, with densely pilose rhachises, bracts, and flowers; lower flowers in twos or threes; pedicels very short; expanded perianth not more than a line in diameter, greenish; segments oblong; stamens very short. Female flowers solitary, with a pilose clavate-trigonous ovary $\frac{1}{6}$ in. long and 6 small ovate segments. Capsule brown, shining glabrous, cernuous, $\frac{3}{4}$ in. long, $\frac{1}{2}$ in. in diam.—Central Madagascar, *Baron* 677! 723! 806! A near ally of *D. heteropoda.*

ALOE DELTOIDEODONTA, n. sp.

Acaulis, foliis parvis oblongo-lanceolatis dentibus parvis contiguis deltoideis stramineis marginatis, pedunculo elongato simplici vel furcato, racemis laxis elongatis, bracteis oblongo-lanceolatis quam flos duplo brevioribus, pedicellis ascendentibus apice articulatis quam bracteæ paulo longioribus, perianthii segmentis quam tubus cylindricus brevioribus, genitalibus inclusis.

Probably acaulescent or nearly so. Leaves 3–4 in. long, not more than an inch broad, narrowed gradually from the middle or below it to an acute point, with a continuous horny border and crowded stramineous deltoid prickles $\frac{1}{12}$ in. long. Peduncle a foot or more long, ancipitous towards the base. Racemes finally 6–9 in. long, lax, especially in the lower half; bracts under $\frac{1}{2}$ in. long, white, membranous, with about 5 distinctly spaced brown ribs on the back. Pedicels ascending; lower $\frac{1}{2}$ in. long. Perianth $\frac{7}{8}$–1 in. long, the ligulate obtuse segments nearly as long as the tube, furnished with 3–5 close green ribs down the back.—Central Madagascar, *Baron* 752! 946! Allied to *A. humilis* and *A. pratensis* of the Cape.

ALOE CAPITATA, n. sp.

Caulescens?, foliis lanceolatis immaculatis dentibus parvis patulis subcontiguis deltoideis stramineis marginatis, pedunculo simplici elongato, racemis capitatis, bracteis parvis oblongo-deltoideis, pedicellis uncialibus et ultra, perianthii segmentis lingulatis tubo cylindrico æquilongis, genitalibus inclusis.

Probably caulescent. Leaves lanceolate, under 2 in. broad, narrowed gradually upwards, margined with spreading stramineous deltoid prickles $\frac{3}{4}$–1 lin. long, $\frac{1}{4}$–$\frac{1}{2}$ in. apart. Peduncle simple, under a foot long. Raceme with 30 flowers or more, with an axis not more than 1–$1\frac{1}{2}$ in. long; bracts white, membranous, $\frac{1}{6}$ in. long, with 2–3 brown ribs down the back; pedicels 1–$1\frac{1}{4}$ in. long, the upper ascending, a few of the lower shorter and spreading. Perianth under an inch long, the yellow segments furnished with 3 green ribs down the back. Capsule trigonous-cylindrical, about an inch long.—Central Madagascar at Andringitra, *Baron* 897! 1353! Inflorescence like that of the Cape *A. Saponaria*. Of this and the other species notes taken from the living plant are needed to complete the description.

ALOE OLIGOPHYLLA, n. sp.

Longe caulescens, foliis productis 2–4 linearibus acuminatis dentibus concoloribus patulis deltoideis distantibus marginatis, pedunculo elongato simplici, racemo simplici subdenso, bracteis minutis deltoideis, pedicellis ascendentibus fructu globoso æquilongis.

Caudex slender, elongated. Produced leaves not more than 2–4 to a rosette, $1\frac{1}{2}$–2 ft. long, $\frac{1}{2}$–$\frac{5}{8}$ in. broad, tapering to a point from above the middle, margined by spreading green deltoid prickles $\frac{1}{12}$–$\frac{1}{8}$ in. long, $\frac{1}{2}$–1 in. apart. Peduncle slender, 6–8 in. long, simple, two-edged towards the base. Raceme moderately dense, 2–3 in. long; bracts minute, deltoid; pedicels finally $\frac{3}{8}$–$\frac{1}{2}$ in. long, arcuate, ascending. Flowers not seen. Fruit globose, $\frac{1}{2}$ in. in diam.—Central Madagascar, *Baron* 1207! Allied to *A.*

tenuior, *A. ciliaris*, and *A. striatula* of the Cape. It may be the undescribed *A. leptocaulon*, Bojer, Hort. Maur. p. 345.

ALOE MACROCLADA, n. sp.

Longe caulescens, foliis magnis lanceolatis margine corneo continuo dentibus parvis deltoideis patulis subcontiguis prædito, pedunculo simplici crasso elongato, racemo densissimo cylindrico sesquipedali, pedicellis brevibus, bracteis magnis oblongis, perianthii tubo subnullo, segmentis lanceolatis, genitalibus exsertis.

Caudex 3 or 4 feet long. Leaves lanceolate, $1\frac{1}{2}$–2 ft. long, 3–4 in. broad near the base, narrowed gradually to the apex, not spotted, furnished with a continuous stramineous horny border and spreading deltoid stramineous prickles $\frac{1}{12}$–$\frac{1}{8}$ in. long and broad, $\frac{1}{4}$–$\frac{1}{2}$ in. apart. Peduncle simple, elongated, terete, nearly an inch thick at the base, $\frac{1}{12}$ in. thick at the bottom of the raceme. Raceme dense, cylindrical, $1\frac{1}{2}$ ft. or more long, $1\frac{1}{2}$ in. in diam. Bracts oblong obtuse, $\frac{1}{3}$ in. long, with several fine ribs down the central third. Pedicels not more than $\frac{1}{8}$–$\frac{1}{6}$ in. long. Perianth $\frac{5}{8}$–$\frac{3}{4}$ in. long, cut down nearly to the base into linear-oblong segments with 5–7 green ribs down the back. Stamens and style both shortly exserted.—Top of Angavo, in the province of Imerina, *Baron* 1178! 1656! Allied to *A. vera* and *A. Sahundra*.

KNIPHOFIA PALLIDIFLORA, n. sp.

Glabra, dense cæspitosa, foliis siccis anguste linearibus quam caulis duplo brevioribus, scapo nudo subpedali, racemo sursum denso, bracteis parvis deltoideis vel lanceolatis, pedicellis apice articulatis, perianthii parvi albi infundibularis segmentis oblongis quam tubus triplo brevioribus, genitalibus inclusis.

A densely tufted erect perennial herb, with the lower part of the old leaves splitting up into fibres. Leaves densely tufted, erect, not more than 6–9 in. long, $\frac{1}{2}$–1 line broad, with not more than 2–3 veins on each side of the distinct midrib, the margin slightly scabrous. Peduncle naked, slender, terete, about a foot long. Raceme dense at the top for 1–2 inches, but lax at the base and with several distant flowerless bracts below it; bracts small, membranous, the lower ones lanceolate, the upper deltoid, $\frac{1}{12}$–$\frac{1}{6}$ in. long. Pedicels ascending, $\frac{1}{8}$–$\frac{1}{6}$ in. long, articulated at the apex, so that the flowers fall easily. Perianth white, without any tinge of red, $\frac{1}{3}$ in. long, with 6 brown stripes running down the keel of the segments and the tube. Stamens as long as the perianth, with minute orbicular anthers.—Ankaratra Mountains, *Baron* 1990! Gathered also by the Rev. Deans Cowan. Adds this well-known Cape and Abyssinian genus to the flora of the island.

DIPCADI HETEROCUSPE, n. sp.

D. bulbo globoso, foliis 2–3 anguste linearibus glabris, scapo tereti gracili elongato, racemo denso 6–8-floro, pedicellis brevibus ascendentibus, bracteis magnis longe cuspidatis, perianthii viriduli segmentis tubo æquilongis, exterioribus in floribus inferioribus breviter, in floribus superioribus longe caudatis.

Bulb globose, $\frac{1}{2}$ in. in diam., with pale brown membranous outer tunics. Leaves 2–3, contemporary with the flowers, narrow linear, nearly as long as the scape, $\frac{1}{8}$ in. broad, firm in texture, tapering to the point, glabrous on surfaces and edge. Scape slender, terete, glabrous, 1–$1\frac{1}{2}$ ft. long. Raceme close, 6–9-flowered; pedicels not more than $\frac{1}{12}$–$\frac{1}{8}$ in. long; bracts $\frac{1}{3}$–$\frac{1}{2}$ in. long, lanceolate, with a long setaceous cusp. Perianth green, $\frac{1}{2}$ in. long, the setaceous cusps of the outer segments not more than $\frac{1}{12}$ in. long in the lower flowers, but growing gradually longer in the upper ones, and the top flowers sterile, with segments cuspidate nearly or quite down to the base, as in the Angolan *D. comosum*, Welw., figured in Trans. Linn. Soc. n. s. vol. i. pl. 34.—Central Madagascar, *Baron* 697! Adds the genus to the flora of the island. A bulb gathered by Dr. Parker at Andramasina is likely another *Dipcadi*; but the specimen is in fruit. The leaves are $\frac{1}{2}$ in. broad, thinner in texture, the raceme very lax, with flexuose ascending pedicels above an inch long, and the fruit a subglobose capsule above $\frac{1}{2}$ in. in diam., with numerous thin black discoid seeds.

HYACINTHUS CRYPTOPODUS, n. sp.

H. bulbo magno ovoideo, foliis 6–10 synanthiis lanceolatis glabris, scapo brevi, racemo denso oblongo, pedicellis brevissimis, bracteis minutis deltoideis, perianthii oblongi rubro-purpurei segmentis oblongis tubo æquilongis, staminibus biseriatis filamentis brevibus, fructu parvo globoso, seminibus in loculo geminis erectis.

Bulb ovoid, above an inch in diameter, with many thick pale membranous tunics. Leaves 6–10 to a bulb, lanceolate, thin and rather fleshy in texture, tapering to an acute apex, $\frac{1}{3}$–$\frac{1}{2}$ in. broad, about 4 in. long in the flowering stage, but afterwards growing out to nearly a foot, quite glabrous both on the surface and margin. Peduncle not more than 2 in. long, hidden by the sheathing bases of the leaves. Raceme dense, oblong, about an inch long; pedicels very short, ascending, not articulated; bracts minute, deltoid. Perianth mauve-purple, $\frac{1}{4}$ in. long, the oblong segments about as long as the tube. Stamens biseriate, inserted high up in the perianth-tube, with short filaments and small oblong anthers. Capsule globose-trigonous, $\frac{1}{6}$ in. long and broad, with a couple of shining black turgid seeds filling up each cell.—Central Madagascar, *Baron* 2164! Allied to the Zambesi-land *H. ledebourioides*, and quite resembling one of the Cape and Tropical-African Scillas of the subgenus *Ledebouria* in general habit. Adds the genus to the Madagascar flora.

CHLOROPHYTUM DECIPIENS, n. sp.

C. fibris radicalibus permultis densis, foliis radicalibus multis anguste linearibus graminoideis glabris crebre nervatis, caule gracili simplici subnudo, racemo angusto elongato, pedicellis brevibus ascendentibus medio articulatis inferioribus 2–3nis, bracteis minutis deltoideo-cuspidatis, perianthii segmentis albidis lanceolatis distincte trinervatis, staminibus quam perianthium paulo brevioribus antheris magnis, stylo exserto, fructu parvo obovoideo-oblongo emarginato.

An erect perennial herb, with a very dense tuft of fleshy cylindrical root-fibres. Leaves 6–8 in a basal rosette, grass-like, a foot or more long, $\frac{1}{8}$–$\frac{1}{6}$ in. broad, closely distinctly ribbed, without any hairs either on the edge or surfaces. Peduncle a foot and a half long exclusive of the raceme, slender, terete, simple, with only two or three very small bract-like leaves. Raceme simple, 4–8 in. long, the lower nodes about an inch apart; bracts fascicled, minute, deltoid; lower pedicels $\frac{1}{8}$–$\frac{1}{4}$ in. long. Perianth $\frac{1}{3}$ in. long, with 3 separated distinct reddish-brown ribs down the back of each segment. Anthers as long as the glabrous filaments. Style $\frac{1}{3}$ in. long. Capsule obovate-oblong, $\frac{1}{3}$ in. long, acutely angled, finely veined across the greenish valves.—Central Madagascar, *Baron* 2070! Belongs to the *Anthericum*-like section of the genus, near *C. pubiflorum*. Adds this large African genus to the island flora.

IPHIGENIA ROBUSTA, n. sp.

Erecta, glabra, caule robusto pedali vel sesquipedali, foliis alternis linearibus glabris, racemo laxissimo 10–12-floro, pedicellis elongatis strictis ascendentibus basi folio magno bracteatis, fructu oblongo stylis 3 parvis falcatis coronato.

Rootstock not seen. Stem stout, erect, flexuose, 1–1$\frac{1}{2}$ ft. long, floriferous in the upper half. Leaves sessile, alternate, 3-4 below the inflorescence, linear, firm in texture, half a foot long, $\frac{1}{4}$ in. broad, distinctly veined, tapering to the point. Flowers 10–12 in a lax deltoid raceme 6–8 in. long, 4–6 in. broad; lower pedicels 2–3 in. long; upper gradually shorter, each bracteated by a reduced leaf at the base. Flowers not seen. Fruit a coriaceous brown oblong loculicidal capsule $\frac{1}{3}$ in. long; seeds brown, semiorbicular, 8–10 in a cell. Styles 3, falcate, persistent, subulate, $\frac{1}{2}$ lin. long.—Central Madagascar, *Baron* 778!

WISNERIA FILIFOLIA, *Hook. fil. Gen. Plant.* iii. 1007.

Aquatilis, foliis elongatis subulatis, pedunculo elongato, floribus in racemum elongatum dispositis, bracteis in cupulam membranaceam connatis, pedicellis quam cupula longioribus, perianthii parvi segmentis exterioribus viridulis ovatis, interioribus petaloideis oblongis vel obovatis, genitalibus inclusis.

A submerged perennial herb with the habit of an *Isoëtes*. Leaves in a dense tuft, subulate, flaccid, sometimes two or three feet long, tapering to a point, dilated into a clasping sheath at the base. Peduncle slender, as long as the leaves, bearing at the top the flowers in a long slender raceme, the males from the upper nodes and the females from the lower, which are 1-2 inches apart; flowers 2–3 to each node, which is sheathed by a truncate membranous collar $\frac{1}{6}$ in. long formed of the connate bracts; pedicels rather longer than the bracts. Female flowers with 3 carpels; and male flowers with 3 stamens. Perianth $\frac{1}{6}$ in. long; 3 outer segments ovate, greenish, persistent; 3 inner white, petaloid, deciduous. Fruit-carpels as long as the persistent perianth-segments.—Central Madagascar, on floating islands of mud in the lakes, *Dr. Parker*! *Baron* 571! A third species of this new genus of Alismaceæ, described by Micheli in the continuation of De Candolle's 'Prodromus,' vol. iii. p. 82. The two other known species are one Indian, the other Central-African.

XYRIS CAPENSIS, *Thunb.*?

Perennis, glabra, dense cæspitosa, foliis paucis rigidulis anguste linearibus, pedunculo elongato ancipiti, spica ovoideo-oblonga bracteis orbicularibus rigidulis castaneis, bracteolis dorso alatis, perianthii fauce pilosa segmentis oblongis quam tubus cylindricus brevioribus, staminibus quam limbus brevioribus, staminodiis nullis, styli ramis elongatis subulatis apice stigmatosis.

Perennial, densely cæspitose, with slender wiry root-fibres. Leaves distichous, the outer unproduced ones lanceolate, castaneous; produced leaves about three to a tuft, $\frac{1}{2}$–1 ft. long, $\frac{1}{12}$–$\frac{1}{8}$ in. broad, rigid in texture, with about 8 distinct ribs. Peduncle slender, $1\frac{1}{2}$–2 ft. long, conspicuously two-angled towards the top. Heads ovoid-oblong, $\frac{1}{2}$–$\frac{3}{4}$ in. long; bracts orbicular, dark brown, rigid in texture, $\frac{1}{6}$ in. long and broad. Perianth-tube cylindrical, $\frac{1}{6}$ in. long; bracteoles as long as the tube, distinctly winged down the back; throat densely pilose; segments oblong. Stamens nearly as long as the limb; anthers oblong-sagittate; filaments short, pilose. Style with 3 branches as long as the stamens. Ovary oblong, acutely angled.—Central Madagascar, *Parker*! *Baron* 568! 1025! Baron 443 is a closely allied apparently new species with narrower subterete leaves and oblong and very glossy castaneous bracts; but the specimens are not complete enough to describe it fully. Thunberg's Cape plant will need to be redescribed before it can be clearly individualized.

XYRIS SEMIFUSCATA, *Bojer MSS.*

Perennis, glabra, dense cæspitosa, foliis pluribus parvis anguste linearibus, pedunculo gracillimo elongato sursum ancipiti, capitulo parvo globoso, bracteis oblongis rigidulis nitidis castaneis, bracteolis lanceolatis acute carinatis haud alatis, perianthii segmentis oblongis quam tubus cylindricus brevioribus, antheris deltoideo-sagittatis filamentis brevissimis, staminodiis nullis, styli ramis brevibus applanatis apice cuneatis.

A densely tufted perennial, with very slender wiry root-fibres. Produced leaves about half a dozen to a rosette, 1–2 in. long, $\frac{1}{2}$ lin. broad, with 5–7 distinct ribs. Peduncle very slender, 6–15 in. long, distinctly 2-edged upwards. Heads globose, $\frac{1}{4}$ in. in diam.; bracts densely imbricated, oblong, dark brown, shining, less firm in texture than those of *X. capensis*, $\frac{1}{6}$ in. long. Perianth with a cylindrical tube $\frac{1}{6}$ in. long, clasped by two rigid lanceolate navicular bracteoles, which are acutely keeled, but not winged on the back; outer segment ovate cucullate, deciduous; inner oblong. Anthers deltoid-sagittate, with very short filaments. Style with 3 short flattened branches.—Central Madagascar, *Bojer*! *Lyall* 398! *Parker*! *Baron* 470! 1089! Native name "Sakoerintany." May be identical with *X. humilis*, Kunth. We have Madagascar examples of *X. platycaulis*, Poir., from Gerrard 53 and Boivin.

ERIOCAULON FLUITANS, n. sp.

***E.* caule elongato submerso foliis capillaribus patulis densis prædito,**

pedunculis dense fasciculatis vagina laxa quam pedunculus 2–4plo breviore præditis, capitulis parvis depresso-globosis, receptaculo glabro, floribus trimeris bracteisque apice parce breviter albo-penicillatis, bracteis oblanceolatis flori æquilongis, perianthii segmentis membranaceis nigricantibus.

Stem slender, floating, submerged, $\frac{1}{2}$–1 ft. long, beset throughout with close spreading capillary leaves 2–3 in. long. Peduncles a dozen or more in a fascicle at the top of the stem, 3–9 in. long, with a loose cylindrical basal sheath 1$\frac{1}{2}$–2 in. long. Capitula depresso-globose, $\frac{1}{6}$–$\frac{1}{5}$ in. in diam., the blackish bracts and flowers with only a few very short deciduous white hairs at the tip. Bracts oblanceolate, membranous, as long as the flowers. Flowers all pedicellate; female with 6 segments of similar texture and colour to the bracts, the outer obovate navicular, the inner oblanceolate; fruit globose, deeply 3-lobed, chestnut-brown, glossy. Male flowers with 6 stamens and very short inner segments.—Central Madagascar, floating in the lakes, *Parker*! *Baron* 926! This belongs to a group of which *E. setaceum*, Linn., is the type, of which the three species already known are Indian and Australian. It is one of the water-plants known under the name of "Volondrano."

MESANTHEMUM PLATYPHYLLUM, n. sp.

M. foliis glabris linearibus vel ensiformibus, pedunculo glabro 1$\frac{1}{2}$–2-pedali, vagina semipedali apice libero lanceolato, capitulo depresso-globoso, bracteis exterioribus oblongis rigidis 2–3-seriatis interioribus capitulo æquilongis, receptaculo dense piloso, floribus bracteisque apice dense albo-penicillatis, perianthii segmentis olivaceis fœminei exterioribus oblongis interioribus oblanceolatis.

Rootstock stout, perennial, with a tuft of cylindrical root-fibres. Leaves in a dense basal tuft, subcoriaceous, glossy, quite glabrous, 6–9 in. long, $\frac{1}{2}$–1 in. broad at the base, tapering gradually to the obtuse tip. Peduncle 1$\frac{1}{2}$–2 ft. long, terete, slender, conspicuously ribbed, with a tight glabrous sheath about half a foot long, with a small free lanceolate tip. Capitula depresso-globose, above $\frac{1}{2}$ in. in diam.; involucre of about 3 rows of very obtuse bracts of coriaceous texture, the outer much shorter than the inner, which just equal the flowers. Inner bracts and perianth-segments olive-green, membranous, with a dense tuft of persistent white hairs at the tip. Outer flowers sessile, female, with 3 oblong outer segments and 3 oblanceolate inner ones. Male flowers pedicellate, with 6 stamens. Central Madagascar, *Baron* 1863! Mr.

Baron has also refound (458 !) the oldest known species of this genus, *M. pubescens*, Kornicke (*Eriocaulon pubescens*, Lam.); and Dr. Kornicke has lately described a new one (*M. Rutenbergianum*, Kornicke) discovered by Rutenberg.

GLUMIFERÆ.

CYPERUS, *Linn.* (Auctore C. B. CLARKE, hinc ad finem p. 296.)

Subgenus I. PYCREUS. Stylus semper 2fidus. Nux glumæ contrarie compressa.

* *Nucis cellulæ extimæ oblongæ, longitudinaliter nec transversim sitæ.* [In *omnibus* speciebus *Cyperi*, nisi hujus sectionis, nucis cellulæ extimæ quadrato-hexagonæ, neque elongatæ sunt.]

1. C. FLAVESCENS, *Linn. Sp. Pl.* p. 68, *nec Linn. herb. propr.*; nuce obovoidea nigro-castanea, non aut obscure transversim albo-notata.

Var. *β. abyssinica*; culmis sæpe elongatis, nuce conspicue transversim albo-notata.—C. abyssinicus (sp.), *Hochst.*!; *Steud. Cyp.* p. 4; *Bœck. in Linnæa*, xxxv. p. 440, *non Oliver.*—C. flavescens, *A. Rich. Fl. Abyss.* ii. p. 474.

MADAGASCAR CENTRALIS, *Baron* n. 636.—DISTRIB. Africa a Madera et Abyssinia usque ad Natal. Mentone.

Nux in eadem umbellula plus minus conspicue transversim notata.

2. C. LANCEOLATUS, *Poir. Encycl.* vii. p. 245; nuce ellipsoidea compressa brunnescente: *Bœck. in Linnæa*, xxxv. p. 442.—C. intermedius, *Steud. in Flora*, 1842, p. 581; *A. Rich. Fl. Abyss.* ii. p. 483 (inter species *Eucyperi* perperam ordinata); *Bœck. in Linnæa*, xxxv. p. 450, var. *β* excl.—C. Eragrostis, *Krauss in Flora*, 1845, p. 754, *non Vahl.*

MADAGASCAR, *Blackburn.*—DISTRIB. Abyssinia.

C. latispicato, Bœck., affinis.

** *Nucis cellulæ extimæ quadrato-hexagonæ.*

3. C. GLOBOSUS, *Allioni, Fl. Pedemont. Auctuarium*, p. 49; umbella simplici, 1-pauci-radiata; spiculis admodum compressis; nuce ellipsoidea acuta. *Bœck. in Linnæa*, xxxv. p. 458, *non Bœck. in Flora* (1879), p. 546.—C. flavidus, *Vahl, Enum.* ii. p. 324, *nec*

Retz., *nec Roxb.*, *nec Bojer.*—C. capillaris, *Roxb. Fl. Ind.* i. 194; *Bojer*, *Hort. Maurit.* p. 379.

MAURITIUS, *Sieber* n. 14, *Bojer*, *Bouton*, *&c.* SEYCHELLES, *Pervillé*, *Horne* nn. 212, 213.—DISTRIB. India &c.; ab Africa nondum visus.

Var. *β. stricta*; caule stricto, involucri bracteis longissimis, spiculis sæpe paucifloris.—C. strictus (sp.), *Roxb.*! *Fl. Ind.* i. p. 200.

BOURBON, *Balfour.*

Var. *γ. tortuosa*; spiculis curvatis etiamque haud raro tortuosis. —C. tortuosus (sp.), *Roxb.*! *Fl. Ind.* i. p. 197.

MAURITIUS, *Pike.*

4. C. POLYSTACHYUS, *Rottb. Descr. et Ic.* p. 39, t. 11. fig. 1 (nuce et pistillo excl.); umbellæ radiis simplicibus rarius divisis; spiculis fasciculatis, suberectis, compressis; nuce oblonga, basi conica, apice truncata. *Baker*, *Fl. Maurit.* p. 408.

MADAGASCAR, *Pervillé* n. 477. MAURITIUS, *Sieber* n. 10, *Blackburn*, *Bouton*, *&c.* BOURBON, *Balfour.* RODRIGUEZ, *Balfour.* SEYCHELLES, *Pervillé* n. 90. NOSSIBÉ, *Pervillé* n. 484.

Var. *Hookeriana*; spiculis laxius spicatis, sæpe patulis aut divaricatis, plus minus ferrugineis aut rubescentibus, angustis.—C. Hookerianus (sp.), *Arnott MS. in Wight* n. 2055, *non Thwaites.* —C. pilosus, *Baker*! *Fl. Maurit.* p. 413, *non Vahl.*—*An* C. minor, *Steud. Cyp.* p. 4?

MAURITIUS, *Grey*, *Bouton.*

Var. *ferruginea*, Bœck. in Linnæa, xxxv. p. 479; spiculis majoribus, fasciculatis aut spicatis, ferrugineis aut lucide castaneo-rubris.—C. ferrugineus (sp.), *Poir. Encycl.* vii. p. 261; *Baker Fl. Maurit.* p. 408.—C. globosus, *Bœck. in Flora* (1879), p. 546, *non Allioni.*

MAURITIUS, *Sieber* n. 5, *Bouton.* BOURBON, *Balfour.*

Var. *Thouarsii*; umbella composita, radiis longiusculis, spiculis similibus iis *Cyp. polystachyi* var. *ferrugineæ.*—C. Thouarsii (sp.), *Kunth*, *Enum.* ii. p. 12; *Bœck. in Linnæa*, xxxv. p. 481.—C. foliosus, *Kunth*, *Enum.* ii. p. 11.

MAURITIUS, *Bojer.*

Var. ? *Baroni*; involucri bracteis cum umbella æquilongis; umbellæ radiis 4–5 usque ad 2 uncias longis, simplicibus 1-spicatis; spicis 4–9-spiculosis, laxissime spicatis; spiculis patulis aut divaricatis, remotis, usque ad ⅔–¾ unciæ longis; glumis subdistantibus castaneo rubris.

MADAGASCAR CENTRALIS, *Baron* n. 489.

Species forsan bona; sed nux omnino similis ei *C. polystachyi.*

5. C. BOIVINI, *Bœck. in Linnæa*, xxxv. p. 481; umbellis 3–1-radiatis, subcapitatis; spiculis 3–5 fasciculatis, sanguineo-rubris, compressis, nuce fere ut in *C. polystachyio.*—C. atropurpureus, *Bojer MS.*

MADAGASCAR, *Blackburn.* BOURBON, *Balfour.*

Forsan pro varietate *C. polystachyi*, melius habendus.

6. CYPERUS (§ PYCREUS) ATRO-BRUNNEUS, *Baker*, n. sp.

Perennis, glabra, foliis elongatis lineari-subulatis, caule gracili subtereti, umbellis 2–3-radiatis foliis 2 elongatis lineari-subulatis bracteatis, spicis simplicibus sessilibus vel pedunculatis, spiculis 6–8 lanceolatis sessilibus 12–15-floris, glumis ovato-navicularibus obtusis atrobrunneis nitidis arcte imbricatis, fructu lenticulari, styli ramis 2 elongatis.

A tufted perennial, with slender glabrous subterete erect stems above a foot long. Produced leaves one to a stem, with a long sheath and an erect linear-subulate blade more than half a foot long. Umbel of two or three rays, one sessile, the others peduncled, bracteated by two long unequal linear-subulate leaves. Spikelets 6–8 to a ray, lanceolate, sessile, ⅓ in. long, the side ones spreading or deflexed. Glumes ovate-navicular, a line long, each imbricated over half the next above it, brown-black, glossy, with a scariose pale border and a conspicuous green keel, not otherwise ribbed. Nut finely reticulated. Style with two long branches.—Central Madagascar, *Baron* 2049! Allied to *C. globosus*, All.

7. C. LANCEUS, *Thunb. Prod.* p. 18; *Fl. Cap.* i. p. 383; stolonibus crassis; nuce obovoidea cum ¼ parte glumæ subæquilonga. —C. melanopus, *Bœck.! in Flora*, 1879, p. 545.—C. nitidus, *Bœck. in Linnæa*, xxxv. p. 461 *partim*, i. e. *plantis et syn. Indicis exclusis.*

MADAGASCAR CENTRALIS, *Parker* n. 12; præsertim in terra Betsileo, *Baron* nn. 7, 832.

8. C. MUNDTII, *Kunth, Enum.* ii. p. 17; culmo per ⅓–⅔ longitudinis a vaginis foliorum intecto; nuce anguste ellipsoidea cum ½ parte glumæ æquilonga.—C. densifolius, *Steud.! Cyp.* p. 6.—C. cruentus, *Baker! Fl. Maurit.* p. 408, *non Retz.*—C. turfosus, *Salzm. MS.*—C. reptans, *Bojer MS.*

MADAGASCAR CENTRALIS, *Baron* nn. 474, 483, *Parker*, *Grey*, *&c.*—DISTRIB. Africæ sp. propria, a Tangier usque ad Cape Town.

C. distichophyllus, *Steud. Cyp.* p. 11 (C. Eragrostis, *A. Rich. Fl. Abyss.* ii. p. 475, *non Vahl*), mihi est *C. Mundtii* forma.

9. C. TREMULUS, *Poir. Encycl.* vii. p. 264; umbella decomposita; spiculis fusco-luteis; nuce oblonga, obtusa. *Bœck. in Linnæa*, xxxv. p. 469; *Baker Fl. Maurit.* p. 409 *partim.*—C. retusus, *Nees*; *Kunth, Enum.* ii. p. 115.

MAURITIUS, *Sieber* n. 7, *Bojer*, *&c.*

10. C. HOCHSTETTERI, *Nees*; *Krauss in Flora*, 1845, p. 755; umbella composita; spiculis lutescentibus aut plus minus rubescentibus brunneisve; nuce crasse ellipsoidea.—C. retusus, *A. Rich. Fl. Abyss.* ii. p. 485, *non Nees.*—C. patuliflorus, *Bœck. in Linnæa*, xxxv. p. 473.—C. flavicomus, *Benth. Fl. Austral.* vii. p. 261, *non Mich.*—C. albo-marginatus, *Steud. Cyp.* p. 10.

Var. β. *russa*; glumis russis (rubro-castaneis), paullo minus remotis.—C. expansus, *Bojer, Hort. Maurit.* p. 380, *non Poir.*—C. tremulus, *Baker, Fl. Maurit.* p. 409 *partim.*

MADAGASCAR, *Hilsenberg et Bojer &c.* MAURITIUS, *Grey &c.*

Subgenus II. JUNCELLUS. Stylus semper 2fidus. Nux glumæ parallele (a dorso) compressa.

11. C. LÆVIGATUS, *Linn. Mant.* p. 79; foliis brevibus aut longis; spiculis globoso-capitatis; glumis albis aut castaneomaculatis. *Baker, Fl. Maurit.* p. 407.—C. mucronatus, *Rottb. Descr. et Ic.* p. 19, t. 8. fig. 4; *Bojer, Hort. Maurit.* p. 379.

MAURITIUS, *Sieber* n. 15, *&c.* RODRIGUEZ, *Balfour.*

Var. ? *cæspitosa*; densissime cæspitosa; culmis numerosis, 1–2 uncias longis, intricato-incurvatis, 1-spiculosis.—*C. lævigatus* forma depauperata, *Baker, Fl. Maurit.* p. 407 *in notâ.*

RODRIGUEZ, *Balfour.*

12. C. PYGMÆUS, *Rottb. Descr. et Ic.* p. 20, t. 14. fig. 4, 5; spiculis congestis sæpe curvatis aut tortis; glumis fructiferis biseriatis neque spiraliter sitis, ovatis neque superne sublatioribus; nuce ellipsoidea aut oblonga utrinque angustata, cellulis extimis parum laxis. *Bojer, Hort. Maurit.* p. 379; *Baker, Fl. Maurit.* p. 407; *Benth. Fl. Austral.* vii. p. 262, *notâ excl.*; *Bœck. in Linnæa*, xxxv. p. 493, var. β *excl.*

MAURITIUS, fide *Bojer*. (Ab insulis Mascariensibus in Kew nondum recepta.)

Isolepis Micheliana, Rœm. et Sch. Syst. ii. p. 114, has the glumes attached in a true spire to the top of the spikelet; the distinction between this and *Cyperus pygmæus* is easily seen in the fruit-spikelets. In the young spikelets the upper part of the spikelet is often not developed; in the fruit the notches on the rhachidia can be observed after the nuts have fallen. The nut of *Isolepis Micheliana* has the outer hyaline cells large, thick, quadrate; so that the margin of the nut under the microscope appears surrounded by a glistening, barred edge, a structure common in *Isolepis* &c., but occurring in no *Cyperus*. The nut moreover in *Isolepis Micheliana* is narrowly oblong, suddenly narrowed at the apex.

13. C. ALOPECUROIDES, *Rottb. Descr. et Ic.* p. 38, t. 8. fig. 2; glumis ovatis in dorso planis, subinflatis, in sicco arcte stipatis marginibus incurvatis vix sese integentibus; stylis 2fidis; nuce parva, ellipsoidea, a dorso compressa. *Baker*, *Fl. Maurit.* p. 409; *Bœck. in Linnæa*, xxxvi. p. 322, var. *a excl.*

SEYCHELLES, *Horne* n. 221.—DISTRIB. Africa, Asia, et Australia Tropicalis.

C. dives, Delile, Egypt. v. t. 4. fig. 3, differt glumis a latere compressis, stylo trifido, nuce plane trigona; glumis in sicco arctius imbricatis sæpe aureo-luteis.

Subgenus III. EUCYPERUS. Stylus, nisi (rarissime) casu, 3-fidus. Nux trigona aut triquetra. Spiculæ multifloræ aut plurifloræ.

Sect 1. ARISTATI. Annui, minores, cæspitosi, foliacei. Spiculæ angustæ, densifloræ; rhachidiorum alæ angustæ non solubiles. Glumæ carinatæ mucronatæ aut aristatæ. Stamina sæpius 1–2. Nux brunnea, gluma multo brevior.

* *Spiculæ digitatæ.*

14. C. AMABILIS, *Vahl, Enum.* ii. p. 318; umbella simplici, capitata aut composita; glumis subemarginatis, in lateribus obscurius concoloriter 1-nervosis, mucrone brevissime excurrente; nuce obovoidea, truncata, cum ⅓ parte glumæ æquilonga. *Baker*, *Fl. Maurit.* p. 411.—C. oligostachyus, C. aureus, *et* C. aurantiacus,

H. B. K. Nov. Gen. et Sp. i. pp. 204, 205.—C. lepidus, *Hochst.*; *Steud. Cyp.* p. 14.

MADAGASCAR, *Pervillé* n. 521, *Gerard* n. 95. NOSSIBÉ, *Pervillé* n. 488. MAYOTTA, *Boivin*.—DISTRIB. Asia, Africa, America Tropicalis.

15. C. CUSPIDATUS, *H. B. K. Nov. Gen. et Sp.* i. p. 104; umbella simplici aut capitata; glumis conspicue viridi 3-nerviis, mucrone longius excurrente; nuce anguste obovoidea aut oblonga quam ½ pars glumæ longiore.

MADAGASCAR, Antananarivo, *Pool*.—DISTRIB. Asia, Africa, America Tropicalis.

16. C. UNCINATUS, *Poir. Encycl.* vii. p. 247; umbella sæpius congesta; glumis 3–5-nerviis, mucrone plane excurrente; nuce obovoidea obtusa, cum ½ parte glumæ vix æquilonga.—C. pectinatus, *Hils. et Bojer in herb. propr.*, *non Vahl.*

MADAGASCAR, *Lyall* n. 84, *Grey*, *Dupetit Thouars*, *&c.*

** *Spiculæ spicatæ.*

17. C. SQUARROSUS, *Rottb. Descr. et Ic.* p. 25, t. 6. fig. 3; spiculis linearibus; glumis remotis ovato-lanceolatis mucronatis. *Linn. Amœn. Acad.* iv. p. 303, *Sp. Pl.* p. 66, *herb. propr.*, *partim.* —C. Maderaspatanus, *Willd. Sp. Pl.* i. p. 278 (*syn. Pluk. excl.*); *Benth. Fl. Austral.* vii. p. 268 *in notâ.*

COMORO, Johanna, *Hildebrandt* n. 1734; *Bouton*.—DISTRIB. Indiæ Orientalis utraque Peninsula.

Sect. 2. COMPRESSI. Annui, mediocres, foliati. Spiculæ compressæ, densifloræ; rhachidiorum alæ angustæ, non solubiles. Glumæ carinatæ, ovato-acutatæ. Nux majuscula, triquetra.

18. C. COMPRESSUS, *Linn. Sp. Pl.* p. 68, *et herb. propr.*; viridis; umbella simplici, laxa. *Bojer, Hort. Maurit.* p. 389; *Baker, Fl. Maurit.* p. 410; *Saund. & Baker, Refug. Bot.* t. 240.—C. brachiatus, *Poir. Encycl.* vii. p. 259.

MADAGASCAR, *Boivin &c.* MAURITIUS, *Sieber* n. 12, *&c.* SEYCHELLES, *Pervillé* n. 91. NOSSIBÉ, *Hildebrandt* n. 2920.—DISTRIB. Asia, Africa, America, in regionibus magis calidis.

Sect. 3. ARENARII. Robusti, foliati. Spiculæ densifloræ; rhachidiorum alæ non solubiles. Filamenta 3, lata. Nux inæqualiter trigona, a dorso sæpe compressa, mediocris, gluma autem multo brevior.

19. C. MARITIMUS, *Poir. Encycl.* vii. p. 240; stolonibus elongatis crassiusculis, squamatis; radicibus non lanosis; spicis globosis multispiculosis, stramineo-brunneis; spiculis lanceolatis, teretiusculis; nuce cum tertia parte glumæ æquilonga, ellipsoidea, obtusa, pinguiore, a dorso multo compressa obscure trigona, nigro-fusca. *Bœck. in Linnæa,* xxxv. p. 439, non *C. rigidus,* Vahl.

MADAGASCAR, *Pervillé* n. 339 *bis.*—DISTRIB. In oris maritimis Zanzibariæ, Zambesiæ.

Culmi pedales. Umbella 5 unc. diam. Spicæ 1½ unc. diam. —Poiret ex exemplo depauperato descriptionem scripserat.

20. C. GALEGENSIS, *C. B. Clarke,* nov. sp.; foliis pluribus, fere 20 unc. longis; umbella simplici, densius contracta; spiculis linearibus, teretiusculis, 20–24-floris, pallidis.

INS. GALEGA, *Bouton.*

Culmus basi lignosus, laciniis (squamarum?) fibrilliformibus subulatis erectis læte brunneis numerosis ornatus, inferne subcompressus, 18 unc. longus, apice trigonus. Folia valida, lenta, in marginibus scabrida, culmum breviter superantia. Involucri bracteæ 4, usque ad 10 unc. longæ, patulæ, angustæ. Umbellæ radii 4–5, longior vix 1 unc. longus. Spicæ breves, 6–10-spiculosæ; rhachis glabra. Spiculæ longæ ½–⅔ unc.; glumæ (etiam fructiferæ) arctius imbricatæ; rhachidiorum alæ non solubiles. Glumæ ovatæ, obtusæ, convexæ, non carinatæ, obscurius 5–7-nerviæ, in lateribus latiuscule estriatæ, pallidæ, obscurius rubro-maculatæ. Stamina 3, breviter exserta; filamenta angustiora. Stylus nuce brevior; rami 3, breviter exserti, rubri. Nux cum ⅓–½ parte glumæ æquilonga, obovoidea, obtusiuscula, trigona, in facie interiore vix concava.—Species quoad spiculas floresque ad *C. latifolium* approximans.

Sect. 4. CONGESTI. Mediocres aut parvi, foliati. Umbella simplex aut congesta. Spiculæ densifloræ, rhachidiorum alæ angustæ, non solubiles. Glumæ obtusæ, in lateribus obscurius nervosæ. Nux trigona, interdum a dorso plus minus compressa, asymmetrica.

21. C. DUBIUS, *Rottb. Descr. et Ic.* p. 20, t. 4. fig. 5; radice fibrosa; culmis cæspitosis fasciculatis, basi incrassatsi, conspicue

vaginatis; spicis 1–4, globosis, $\frac{1}{3}$ unc. diam., congestis, viridistramineis; nuce subsymmetrice trigona. *Nees in Wight's Contrib.* p. 85 (tab. *Rumph. excl.*); *Baker, Fl. Maurit.* p. 409.—C. kyllingioides, *Vahl, Enum.* ii. p. 312.—C. capitatus, *Poir. Encycl.* vii. p. 246; an *Bojer Hort. Maurit.* p. 379?—C. mollis, *Poir. Encycl.* vii. p. 247.—C. capitellatus, *Rœm. et Sch. Syst.* ii. *Mant.* p. 101.

MADAGASCAR CENTRALIS, *Baron* n. 1510, *Gerrard.* SEYCHELLES, *Horne* n. 644. RODRIGUEZ, *Balfour.* COMORO, *Bojer, Bouton.*

22. C. OBTUSIFLORUS, *Vahl, Enum.* ii. p. 308; culmis in apice rhizomatis lignosi fasciculatis, basi bulboso-incrassatis, apice triquetris, monocephalis; involucri bracteis 2–5, recurvato-patulis, longiusculis, basi dilatatis; spiculis ovoideis, compressis, subturgidis, abbreviatis, 8–16-floris; nuce cum tertia parte glumæ æquilonga, triquetra, subsymmetrica. *Bœck. in Linnæa,* xxxv. p. 528, var. *α*.—C. sphærocephalus *β*. leucocephalus, *Kunth, Enum.* ii. p. 45.—C. niveus *β*. polyphylla, *Bœck. in Flora,* 1879, p. 550, *non Retz.*—C. ambongensis, *Bœck. in Flora,* xxxviii. p. 361.

MADAGASCAR, Ambongo, *Pervillé* n. 690, *Lyall* n. 92 *&c.* COMORO, *Bojer.*

Glumæ interdum in folia 1–2 uncias longa transeuntes. Var. *β. flavissima,* Bœck., ab ins. Mascarenis nondum recepta est.—Species *C. niveo,* Retz. (Indico) maxime affinis. *C. niveus* differt præsertim spiculis oblongis, elongatis, magis compressis; glumis pluribus, arctius approximatis imbricatis.

23. C. EXILIS, *Willd.*; *Kunth, Enum.* ii. p. 50. Tenuis; radice fibrosa; culmis tenuibus, fasciculatis, basi incrassatis, conspicue vaginatis, apice monocephalis; involucri bracteis 2–3, $\frac{1}{2}$–2-unc.; spiculis 3–7, fusco-brunneis; nuce obovoidea, triquetra, quam $\frac{1}{2}$ pars glumæ breviore. *Bœck. in Linnæa,* xxxv. p. 506.—C. pannonicus, var. *β*, *Poir. Encycl.* vii. p. 242.

MAURITIUS, La Pouce, *Gardner*; *Sieber* n. 9. MADAGASCAR, *Petit Thouars,* fide *Poiret.*

24. C. STOLONIFERUS, *Retz. Obs.* iv. p. 10; rhizomate longe repente; culmis basi bulbosis; umbellis pauciradiatis, contractis; spiculis subteretibus, rubro-notatis; nuce obovoidea a dorso compressa. *Bœck. in Linnæa,* xxxv. p. 489 (syn. *C. tuberoso* et var. *β*. excl.).—C. tuberosus, *Bojer, Hort. Maurit.* p. 379; *Baker, Fl. Maurit.* p. 410, *nec Rottb.*

MAURITIUS, *Sieber* nn. 11, 28; *Ayres.*

25. C. Pervillei, *Bœck. in Linnæa*, xxxviii. p. 359. Rigidus; culmis fasciculatis, basi subincrassatis; foliis rigidis; umbella in capitulum specie simplex fere congestum; glumis subdistantibus, per totam fere latitudinem conspicue nervosis, in dorso convexis, vix carinatis.

N.O. de Madagascar, *Pervillé* n. 645.

Sect. 5. Haspani. Folia involucrique bracteæ sæpe breves. Spiculæ angustæ, densifloræ; rhachidiorum alæ angustæ, non solubiles. Nux minima, albida, sæpe minutissime scabrida.

26. C. Haspan, *Linn. Sp. Pl.* p. 66, *partim, nec Linn. herb. propr.* Viridis aut pallidus; rhizomate repente; umbella pluriradiata, composita; spicis digitatis, 3–8-spiculosis. *Bœck. in Linnæa*, xxxv. p. 574, var. *α* excl.

Madagascar, *Hilsenberg et Bojer*; Madagascar centralis, *Parker.*

27. C. æqualis, *Vahl, Enum.* ii. p. 320; umbellæ radiis plurimis, usque ad 50–80; spicis digitatis, 1–5-spiculosis; nuce parva, albida, minutissime scabrida. *Baker, Fl. Maurit.* p. 412, syn. *C. madagascariensi* excl.—C. prolifer, *Lam. Ill.* i. p. 147.—C. papyroides, *Poir. Encycl.* vii. p. 272.—Papyrus æqualis, *Bojer, Hort. Maurit.* p. 381.

Madagascar, Ambongo, *Pervillé* n. 660, *Boivin.* Mauritius, *Sieber* n. 8, *Bojer, &c.*

28. C. flavidus, *Retz. Obs.* v. p. 13. Maturus flavidus aut nigrescens; radice fibrosa sæpissime annua; foliis cum culmo sæpe æquilongis; involucri foliis 2–3, culmum sæpe (interdum longe) superantibus; spiculis minimis, fasciculatis; stamine 1, raro 2; nuce minima obtuse obovoidea, contra rhachin compressa, dorso convexa vel vix carinata, albido marmorata, scabra, punctata vel lævi. *Roxb. Fl. Ind.* i. p. 200.—C. tenuispicus, *Steud.! in Pl. Hohenack.* n. 1670, *Cyp.* p. 11.—C. Haspan, *Rottb. Descr. et Ic.* p. 36, t. 6. fig. 2; *Bœck. in Linnæa*, xxxv. p. 574, var. *α*; (*an Linn. partim?*).—C. microcarpus, *Bœck. in Reliq. Rutenb.* i. p. 37, *e descr.*; *Pluk. Alm.* t. 192. fig. 2.

Ins. Seychelles, *Horne* n. 634.—Distrib. India orientalis, Africa et Australia tropicales.

29. C. denudatus, *Vahl, Enum.* ii. p. 324; *Bœck. in Linnæa*, xxxv. p. 576.

MADAGASCAR, fide *Bœck.* in Reliq. Rutenb. i. p. 37.—DISTRIB. Africa australis.

Sect. 6. ELEGANTES. Foliati, sæpe virides. Involucri bracteæ plures, longæ latæque foliaceæ. Umbella sæpius laxe composita, spicis ultimis digitatis paucispiculosis. Rhachidiorum alæ angustæ, non solubiles. Glumæ laxius imbricatæ, ovatæ, obtusæ, multinervosæ, basi auriculatæ, secus rhachidium plus minus decurrentes, apice obtusæ breviter mucronatæ. Antheræ mucrone albido scabrido terminatæ. Nux cum ½–¾ glumæ æquilonga, triquetra aut plane trigona.

30. C. LONGIFOLIUS, *Poir. Encycl.* vii. p. 270. Involucri bracteis sæpe ⅓ unc. latis, multistriatis, etiamque 2–4 nervis validioribus percursis; spiculis 8–10-floris; glumis laxe imbricatis, basi auriculatis decurrentibus; nuce cum ⅔–¾ glumæ æquilonga, oblonga. *Bojer, Hort. Maurit.* p. 380; *Baker, Fl. Maurit.* p. 413.

MADAGASCAR, *Petit-Thouars*, fide *Poiret.* MAURITIUS, *Bouton, Ayres, &c.*

C. eleganti, Linn., affinis; differt præcipue nuce angustiore.

31. C. ELEGANS, *Linn. Sp. Pl.* p. 68; involucri bracteis sæpe ⅓ unc. latis, multistriatis, etiamque 2–4 nervis validioribus percursis; spiculis 10–22-floris, haud raro solitariis, pedicellatis, sæpius digitatis, nuce cum dodrante glumæ æquilonga, late ellipsoidea, utrinque angustata, acute triquetra. *Bœck. in Linnæa*, xxxv. p. 532. C. nigro-viridis, *Thwaites, Enum. Pl. Zeyl.* p. 344.

MADAGASCAR CENTRALIS, *Baron* n. 526, *Parker.* COMORO, Johanna, *Hildebrandt* n. 1739.—DISTRIB. Africa Occidentalis (ab Africa Orientali adhuc non recepta). India Orientalis cum Zeylania. China. America Tropicalis.

In exemplis, quam Mascarensibus tam Indicis, rhachidiorum alæ latæ hyalinæ conspicuæ videntur. Spiculæ pedicellatæ quasi spicæ 1-spiculosæ habendæ.

Sect. 7. ALTERNIFOLII. Involucri bracteæ plures, longæ. Umbella composita, spicis ultimis numerosis paucispiculosis. Rhachidiorum alæ perangustæ, non solubiles. Glumæ imbricatæ, basi truncato-solubiles nec decurrentes. Antheræ mucronatæ, vix albidæ. Nux cum dodrante glumæ æquilonga, triquetra aut plane trigona.

32. C. ALTERNIFOLIUS, *Linn. Mant.* p. 28; umbella imperfecta subsolute corymbosa, radiis remotiusculis, alternis; spicis 3–7-spiculosis, digitatis aut specie saltem spicatis, pallidioribus. *Bœck. in Linnæa*, xxxv. p. 568.

MADAGASCAR, fide *Kunth*. BOURBON, *Boivin*, fide *Bœckeler*.—Exempla visa culta.

33. C. BARONI, *C. B. Clarke*, nov. sp.; umbella supradecomposita; spicis paucispiculosis, digitatis; spiculis abbreviatis 6–10-floris, fusco-castaneis; nuce ellipsoidea cum tribus quartis glumæ æquilonga.

MADAGASCAR CENTRALIS, *Baron* nn. 484, 695.

Culmus 15–30-unc. Folia plura 9–18 unc. lata. Involucri bracteæ plures, usque ad 9-unc., patulæ, latæ, striatæ. Umbella diam. 8 unc.; spicæ parvæ innumerosæ, sæpissime 3–4-spiculosæ. Spiculæ longæ $\frac{1}{8}$–$\frac{1}{6}$ unc. Glumæ parvæ, minute apiculatæ, in dorso scabridæ virides, in lateribus rubro-castaneæ concoloriter striatæ, basi non decurrentes. Stamina 3; antheræ lineares subacutæ, rubescentes. Stylus brevis rami 3, e gluma breviter exserti. Nux trigona, utrinque angustata.—*C. textili* affinis.

34. C. BALFOURI, *C. B. Clarke*, nov. sp.; umbella decomposita; spicis 1-paucispiculosis, digitatis; spiculis 8–14-floris, pallide brunneis; nuce anguste obovoidea cum duabus tertiis glumæ æquilonga.

BOURBON, *Balfour*.

Culmi plures, 20 unc. longi, apice triquetri. Folia plura, duabus tertiis æquilonga, vix $\frac{1}{5}$ unc. lata. Involucri bracteæ 3–5, longæ 6 unc., latæ vix $\frac{1}{4}$ unc. Umbella diam. 5 unc.; spiculæ haud raro solitariæ, pedicellatæ. Glumæ arctius imbricatæ, ovatæ breviter acutæ, maturæ fere concoloriter brunnescentes; laterum pars estriata latiuscula. Stamina 3; antheræ vix apiculatæ. Stylus brevis; rami 3, e gluma breviter exserti. Nux trigona, apice obtusiuscula.—*C. Baroni* affinis.

Sect. 8. DIFFORMES. Annui, foliati. Involucri bracteæ longæ. Umbella simplex vel composita; spicæ multispiculosæ. Spiculæ parvæ vel inter minores; glumæ obtusiusculæ; rhachidium vix alatum. Nux duas tertias partes glumæ superans.

* *Spiculæ laxiuscule spicatæ.*

35. C. IRIA, *Linn. Sp. Pl.* p. 67 (tab. Rheede cit. excl.) *et herb. propr.*; *Bojer, Hort. Maurit.* p. 381; *Bœck. in Linnæa*, xxxv.

p. 595.—C. panicoides, *Lam. Ill.* i. p. 145.—C. microlepis, *Baker, Fl. Maurit.* p. 410, *non Bœck.*

MADAGASCAR, fide *Bojer.* MAURITIUS, *Grey, Bouton, &c.* SEYCHELLES, *Horne.*—DISTRIB. In oryzetis gerontogeis.

In a species like *C. Iria* nearly all the European herbarium specimens are exceptionally large, gathered as fine examples; *C. microlepis*, Baker, is the form abundant in dibbled rice, where the seed of *C. Iria* germinates in August, and is hurried into flower by the approach of winter.

** *Spiculæ fasciculatæ.*

36. C. DIFFORMIS, *Linn. Amœn. Acad.* iv. p. 302, *Sp. Pl.* p. 67; nuce cum gluma fere æquilonga, æqualiter triquetra, ellipsoidea aut subovoidea, pallida. *Bojer, Hort. Maurit.* p. 380; *Baker, Fl. Maurit.* p. 411.

MADAGASCAR, *Pervillé* nn. 468, 482, *Hildebrandt* n. 3425, *Baron, &c.* MAURITIUS, *Sieber* n. 17, *Bojer, &c.*—DISTRIB. Per oryzeta veteris orbis.

37. C. BAKERI, *C. B. Clarke*; nuce duabus tertiis glumæ æquilonga, rotundato-trigona, apice conica subrostrata, nigra.—C. Gardneri, *Baker, Fl. Maurit.* p. 413, *non Nees.*

MAURITIUS, *Gardner.*

Species *C. pulcherrimo*, Willd., proxima. Spiculæ longæ $\frac{1}{2}$ unc., latæ $\frac{1}{12}$ unc., admodum compressæ, pallide fuscæ. Glumæ late biseriatæ approximatæ, in sicco vix imbricatæ, superne incurvatæ, basi non decurrentes; laterum cellulæ quadrato-hexagonæ, laxæ. Stamina 3, vix exserta; antheræ lineari-oblongæ, obtusæ, rubescentes. Stylus nuce brevior; rami 3, breves.—*C. Gardneri*, Nees, species Bœckelero ignota, Americana, a *C. Bakeri* distat!

Sect. 9. DISTANTES. Majusculi, foliati. Umbella magna. Spiculæ lineares; rhachidiorum alæ angustæ, non solubiles; glumæ distantes, obtusiusculæ. Nux dimidium glumæ superans, angusta.

38. C. DISTANS, *Linn. f. Suppl.* p. 103; spiculis spicatis, sessilibus, florum expansionis tempore rectangulatim divaricatis; glumis oblongo-obovoideis; nuce obtusiuscule trigona.—*Bojer, Hort. Maurit.* p. 380 partim?; *Baker, Fl. Maurit.* p. 411 partim; *Bœck. in Linnæa*, xxxv. p. 612 (*syn. quibusdam ad* C. nutantem *amandatis*).—C. elatus, *Rottb. Descr. et Ic.* p. 37, t. 10 (*nec Linn., nec* Papyrus elatus, *Nees*).

MADAGASCAR, *Pervillé* n. 473, *Baron* n. 680. MAURITIUS, *Sieber* n. 13. BOURBON, *Balfour*. COMORO, *Hildebrandt* n. 1737. —In regione tropica totius fere orbis.

39. C. NUTANS, *Vahl, Enum.* ii. p. 363; radiis elongatis cum spicis (floris expansionis tempore) ascendentibus nutantibus; glumis ellipticis obtusis; nuce trigona in facie itneriore vix concava.—*Bœck. in Linnæa,* xxxv. p. 597.—C. Jacquini, *Schrad.*; *Fenzl in Denksch. Akad. Wissen.* 1854, p. 54, t. 1.—C. distans β. major, *Thwaites, Enum. Pl. Zeyl.* p. 432; *Bojer, Hort. Maurit.* p. 380; *Baker, Fl. Maurit.* p. 411 partim.

MADAGASCAR, *Boivin*. MAURITIUS, *Sieber* n. 18, *Bojer, &c.* RODRIGUEZ, *Balfour*. SEYCHELLES, *Horne* n. 216, *Bouton* 22.—DISTRIB. India orientalis.

Sect. 10. PROCERI. Robustiores, foliati. Umbella majuscula, composita. Spiculæ majusculæ, multi- (aut pluri-)floræ, rhachidiorum alæ angustæ, non solubiles. Nux cum $\frac{1}{3}$–$\frac{1}{2}$ glumæ æquilonga trigona, a dorso interdum plus minus compressa.

40. C. LATIFOLIUS, *Poir. Encycl.* vii. p. 268; foliis latis, usque ad unciam haud raro latis; umbella 6–10 unc. diam., composita, spiculis densis; spicarum rhachi minute pilosa; spiculis 16–28-floris; glumis subovatis in margine superiore hyalinis. *Bojer, Hort. Maurit.* p. 380; *Baker, Fl. Maurit.* p. 413.—C. scoparius, *Poir. Encycl.* vii. p. 253?

MADAGASCAR, *Lyall, Parker*. MAURITIUS, *Sieber* n. 16, *Bojer, &c.*

Sect. 11. SOLUBILES. Spiculæ multifloræ, sæpius numerosæ; rhachidiorum alæ non solutæ. Nux trigona, subsymmetrica, non (aut obscurius) a dorso compressa, cum $\frac{1}{2}$–$\frac{2}{3}$ glumæ sæpius æquilonga.—(Species perennes.)

* *Folia abbreviata aut subnulla.*

41. C. ARTICULATUS, *Linn. Sp. Pl.* p. 66. Subaphyllus; culmis in sicco plane nodosis; involucri bracteis brevissimis, 1 unc. raro superantibus. *Bojer, Hort. Maurit.* p. 378; *Baker, Fl. Maurit.* p. 412.—C. niloticus, *Forsk*; *Beauv. Fl. d'Oware,* p. 63, t. 97. fig. 2.

MADAGASCAR, *Gerrard*. SEYCHELLES, *Horne* n. 237. BOURBON, *Balfour.* MAURITIUS, fide *Bojer.*—DISTRIB. In regionibus calidis totius fere orbis.

42. C. CORYMBOSUS, *Rottb. Descr. et Ic.* p. 42, t. 7. fig. 4. Aphyllus aut breviter foliatus; involucri bracteis brevibus vel cum umbella æquilongis; glumis florigeris imbricatis; styli ramis breviter exsertis. *Bœck. in Linnæa,* xxxvi. p. 277 partim, *nec Kunth.*—C. diphyllus, *Retz. Obs.* v. p. 11; *Bœck. in Linnæa,* xxxvi. p. 272.

INDIA ORIENTALIS; AUSTRALIA BOREALIS.

Var. *β. Pangorei,* Rottb. Descr. et Ic. p. 31, t. 7. fig. 3 (sp.). Spiculis 1 unc. longis, 18–36-floris.—C. corymbosus, forma macrostachya, *Bœck. in Linnæa,* xxxvi. p. 277.

NOSSIBÉ, *Boivin.*—DISTRIB. India orientalis.

C. tegetum, Roxb. (= *C. corymbosus,* Kunth, Bœck., pro majore parte) differt glumis florigeris in sicco non imbricatis, stylis longe exsertis; in herb. Kewensi e Mauritio sub nomine "*C. textilis,* introduite de Pondicherry" receptus est.

43. CYPERUS (§ EUCYPERUS) HETEROCLADUS, *Baker,* n. sp.

C. foliis productis subnullis, caule robusto pedali triquetro lateribus excavatis, umbellæ radiis 6–8 sessilibus vel pedunculatis simplicibus vel furcatis, spicis densis oblongo-cylindricis, spiculis 20–40 et ultra subcylindricis ascendentibus 5–6-floris, glumis obovatis obtusis arcte imbricatis ferrugineis viridi carinatis margine pallidis, fructu triquetro, styli ramis 3 brevibus patulis.

Stems about a foot long, stout, acutely triquetrous, sheathed tightly at the base by several brown linear rudimentary leaves, one produced into a very short green linear blade. Umbels of 6–8 rays, bracteated by three linear leaves 2–3 inches long, some simple, sessile or shortly peduncled, two or three with a longer peduncle and bearing a pair of spikes. Spikes $\frac{1}{2}$–$\frac{3}{4}$ in. long, consisting of very numerous dense sessile ascending spikelets. Spikelets $\frac{1}{6}$ in. long, obscurely flattened. Glumes obovate-oblong, obtuse, $\frac{1}{12}$ in. long, bright red-brown, with a pale border and a distinct green keel, each imbricated more than halfway over its next neighbour. Nut not seen mature.—Central Madagascar, *Baron* 2120! Allied to the European *C. longus,* L., receding towards § *Mariscus* by its few flowers and almost cylindrical spikelets.

** *Foliati.*

44. C. ROTUNDUS, *Linn. Sp. Pl.* p. 67, *non Linn. herb. propr.*;

spiculis breviter spicatis, suberectis, multifloris, compressis, nunquam lutescentibus; glumis per ½–⅔ latitudinis nervosis; styli ramis longius exsertis. *Bojer, Hort. Maurit.* p. 379; *Baker, Fl. Maurit.* p. 410.—C. bicolor, *Vahl, Enum.* ii. p. 340; *Bojer, Hort. Maurit.* p. 379.—C. maritimus, *Bojer, Hort. Maurit.* p. 378 (fide Baker loc. cit.), *non Poir.*

MADAGASCAR, *Hildebrandt* n. 3320. NOSSIBÉ, *Hildebrandt* n. 3355. MAURITIUS, *Sieber* n. 6 &c. BOURBON, *Balfour.* COMORO, Johanna, *Hildebrandt* n. 1736, *Blackburn.* SEYCHELLES, *Bouton* n. 23.—DISTRIB. In oryzetis fere totius orbis pestis.

45. C. ESCULENTUS, *Linn. Sp. Pl.* p. 67; spiculis spicatis, patulis, viridi-lutescentibus aut brunneis; glumis ovatis, obtusis, per totam fere latitudinem striatis. *Bœck. in Linnæa,* xxxvi. p. 287.—C. maritimus, *Bojer! herb. propr. partim.*

MAURITIUS, *Bojer.* COMORO, *Bouton.*—DISTRIB. In regionibus calidioribus totius fere orbis.

46. C. TENUIFLORUS, *Rottb. Descr. et Ic.* p. 30, t. 14. fig. 1; culmis elongatis; umbella composita, laxius divaricata; spiculis angustis, pallidioribus, floriferis, rectangulatim patulis; glumis remotioribus, imbricatis. *Roxb. Fl. Ind.* i. p. 199, et *Ic. ined.* t. 1109 *in herb. Kew.* (*nec Jacq.*, *nec* C. longus, var. tenuiflora, *Bœck. in Linnæa,* xxxvi. p. 281).—C. torosus, *Vahl, Enum.* ii. p. 339.—C. Rœstelii, *Kunth, Enum.* ii. p. 58.—C. pertenuis, *Bojer! Hort. Maurit.* p. 379, *non Roxb.*—C. longus, *Baker, Fl. Maurit.* p. 411, *non Linn.*—C. rotundus, var., *Benth. Fl. Austral.* vii. p. 279.—Cyperus, *Wall. List* n. 3329, A, L *partim.*

MAURITIUS, *Bojer, Horne, &c.* GALEGA, *Blackburn.*—DISTRIB. Socotra. India orientalis. Australia.

Culmus basi incrassatus lignescens; stolones elongati tenues. Spiculæ quam *C. rotundi* angustiores, sæpius pallescentes. Nux in exemplis Mascarensibus non visa, in exemplis Australiensibus et Soctrensi obtuse trigona, a nuce acute triquetra *C. rotundi* multo recedens.—Species *C. rotundo* proxima, a *C. longo* causa rhizomatis diversa.—*C. tenuiflorus,* Jacq., a *C. longo* var. *badio* vix differt. *C. pertenuis,* Roxb., est *C. scariosus,* R. Br.

Sect. 12. EXALTATI. Alti, foliati. Umbella magna. Spiculæ innumerosæ, anguste lanceolatæ, compressæ, densifloræ. Stylus 3-fidus. Nux trigona, dimidio glumæ brevior.

47. C. DIVES, *Delile, Egypt,* v. t. 4 fig. 3; umbella composita,

spicis cylindricis, digitatis; spiculis densis, floriferis rectangulatim patulis, sæpius lutescentibus; glumis dense stipatis, late ovatis obtusis, interdum breviter mucronatis. *A. Rich. Fl. Abyss.* ii. p. 480.—C. fastigiatus, *Forsk. Æg.-Arab.* p. 14.—C. alopecuroides, var. *α*, *Bœck. in Linnæa*, xxxvi. p. 321; *Oliver in Trans. Linn. Soc.* xxix. p. 166, *non Rottb.*

MADAGASCAR, *Hildebrandt* n. 3426. NOSSIBÊ, *Boivin.* COMORO, *Hildebrandt* n. 1738.—DISTRIB. Africa borealis et centralis. Syria. India orientalis. Australia.

Species a *C. alopecuroide*, quam nuce trigona stylo trifido, tam structura spiculæ glumisque lateraliter compressis neque in dorso complanatis, longissime distans; sed forsan cum *C. exaltato*, Retz., melius jungenda. Ex exemplis Indicis huc (a me) relatis, alia cum exemplis Africanis exacte quadrant, alia, an varietates *C. exaltati*, Retz., var. *altæ* (sp.) Nees, anne formæ *C. divitis* sint, nec mihi neque amicissimo Baker sat certum videtur. Exemplum Australiense (a Bentham sub *C. exaltato*, Retz., ordinatum) cum exemplis Mascarensibus bene congruit.

48. C. IMMENSUS, *C. B. Clarke*, nov. sp.; umbella maxima, composita; spicis cylindricis densis; spiculis innumerosis, $\frac{2}{3}$ unc. longis, densifloris, undique rectangulatim divaricatis; nuce ellipsoidea, trigona, cum dimidio glumæ æquilonga.

N.O. de MADAGASCAR, *Pervillé* n. 483.

Culmus apice triqueter, $\frac{1}{4}$ unc. diam. Folia robusta, longa. Involucri bracteæ plures, usque ad 18 unc. longæ, $\frac{3}{4}$ unc. latæ, robustæ, crassæ. Umbella 2–3 ped. diam.; spicæ ultimæ pedunculatæ, solitariæ vel digitatæ, longæ $2\frac{1}{2}$ unc. latæ $1\frac{1}{4}$ unc., 60-spiculosæ. Spiculæ 40-floræ, quam in aliis speciebus vicinis majores, compressæ, pallide luteo-brunneæ; rhachidium vix alatum. Glumæ compressæ, ovatæ, acutatæ, submucronatæ, in dorso confluenti-1–3-nerviæ viridescentes, in lateribus subenerviæ. Stamina 3, vix exserta; antheræ lineari-oblongæ, muticæ. Stylus brevis; rami 3, e gluma breviter exserti. Nux utrinque angustata, pallida.

Sect. 13. SPICATI. Spiculæ pauci- (sæpius 8–5-)floræ, spicatæ, divaricatæ, oblongo-lanceolatæ.—Majusculi, foliati, umbellis compositis.

49. C. PENNATUS, *Lam.*; *Poir. Encycl.* vii. p. 240. Spiculis laxiuscule spicatis, pallidis subrubescentibus; nuce ellipsoidea trigona utrinque angustata, quam dimidia pars glumæ subbreviore,

nigra reticulatim albo-velata. *Baker, Fl. Maurit.* p. 413; *Benth. Fl. Austral.* vii. p. 284.—C. canescens, *Vahl, Enum.* ii. 355; *Bœck. in Linnæa,* xxxvi. p. 340.

SEYCHELLES, *Horne* n. 219.—DISTRIB. India. Asia australi-orientalis. Australia tropica. Polynesia.

50. C. LIGULARIS, *Linn. Amœn. Acad.* v. p. 391, *Sp. Pl.* p. 70; spiculis dense congestis rufescentibus. *Bœck. in Linnæa,* xxxvi. p. 332.—C. glandulosus, *Rolfe*! *in Trimen's Journ. Bot.* n. s. ii. p. 362.—Mariscus glandulosus, *Bojer, Hort. Maurit.* p. 382.—*Sloane, Jamaica,* i. p. 36, t. 9.

GALEGA, *Bouton, Blackburn.*—DISTRIB. In oris Africæ, a Loango usque ad Senegambiam, frequens. Madera. America tropica. Australia, *fide* Bœckeler.

C. Gunnii, Hook. f., floriger *C. ligularem* aliquando simulat; nux autem *C. Gunnii* elongato-oblonga est.

Sect. 14. LEPTOSTACHYI. Spiculæ pauci- (sæpius 8–4-)floræ, spicatæ, divaricatæ, lineares. Glumæ distantes, elongatæ, adpressæ. Nux longiuscula, angusta.—Rhachidiorum genicula spongioso-incrassata. Nux inter alas rhachidii abscondita.

51. C. FERAX, *A. Rich. in Act. Soc. Hist. Nat. Paris,* i. p. 106. Spiculis in forma typica 8–4-floris, subflexuosis aut rarius rectis. *Bœck. in Linnæa,* xxxvi. p. 399; *Decaisne in Ann. Mus. d'Hist. Nat.* iii. p. 359 (errore typ. *ferox*).—C. flexuosus, *Vahl, Enum.* ii. p. 359; *Rottb. in h. propr.*—C. phleoides, *Nees*; *Steud. Cyp.* p. 62; *Seem. Fl. Viti,* p. 319.—C. Prescottianus *et* C. multiceps, *Hook. et Arn. Bot. Beechey Voy.* p. 100.—C. strigosus, *Hook. et Arn.* loc. cit. p. 99, *non Linn.*—C. multibracteatus, *Bœck.*! *in Flora* 1875, p. 107.—C. pennatus, *Bœck. in Linnæa,* xxxvi. p. 404, *non Lam.*—C. luteus, *Bœck.*! *in Linnæa,* xxxviii. p. 370 (cum pluribus aliis).

N.O. de MADAGASCAR, *Pervillé* nn. 451, 516.—DISTRIB. India orientalis (frequens). Malaya. Polynesia (frequens). America tropicalis. Terra Zambesica. Madera.

Exempla Mascarenica (*C. luteus,* Bœck.) cum *C. ferace* Americano typico optime congruunt. Exempla Indica (or.) et in insulis Pellew, Samoa &c. lecta omnino similia.—C. odoratus, *Vahl*; *Bœck. in Linnæa,* xxxvi. p. 407, *non Linn.*, paullo differt spiculis 14–21-floris, sed mihi varietas videtur.

Subgenus IV. MARISCUS. Stylus 3fidus. Nux trigona aut triquetra. Spiculæ 1–5-floræ, 1–2- (raro 3-)nuciferæ.—Habitus omnino subgeneris *Eucyperi* sectionis *Leptostachyæ*; rhachidium simile ei *Leptostachyæ*.

52. C. UMBELLATUS, *Benth. Fl. Hongk.* p. 386, *non Roxb.*; spicis pro maxima parte pedunculatis, cylindricis, densissime spiculosis; spiculis fructus tempore sæpe deflexis, compressis, 1-nuciferis; gluma fertili superiores superante aut subæquante. Kyllinga umbellata, *Rottb. Descr. et Ic.* p. 15, t. 4. fig. 2.—Mariscus umbellatus, *Vahl, Enum.* ii. p. 376; *Bojer, Hort. Maurit.* p. 382; *Baker, Fl. Maurit.* p. 415.

MAURITIUS, *Sieber* n. 4, *Bouton, &c.* MADAGASCAR, *Gerrard.*

Hæc planta est *C. ovularis*, Bœck. in Linnæa, xxxvi. p. 376, fide num. cit. et tab. Rottb. cit.; clarus autem Bœckeler a cæteris Mariscis Gerontogeis (in charactere subsectionis) distinguit, "spicis (simplicibus) suborbiculatis," quæ verba figuræ Rottboellii jungere nequivi.—*C. ovularis*, Torrey (cf. Benth. Fl. Austral. vii. p. 290 in notâ) longius distat.

Var. *panicea*, Rottb. Descr. et Ic. p. 15, t. 4. fig. 1 (sp.); spicis pro maxima parte sessilibus minus densispiculosis; spiculis fructus tempore patulis aut interdum subadscendentibus, 1-nuciferis.—C. paniceus, *Bœck. in Linnæa,* xxxvi. p. 380.

SEYCHELLES, *Delisle*; *Horne* n. 639.

Var. *cylindrostachys*, Bœck. in Linnæa, xxxvi. p. 383 (sp.); spicis pedunculatis; spiculis majusculis sæpius binuciferis; gluma fertili inferiore quam superior multo breviore.

NOSSIBÉ, *Boivin.* N.O. de MADAGASCAR, *Pervillé* n. 501. MAURITIUS, *Ayres.*

Involucri bracteæ 6, longæ 5 unc., latæ $\frac{1}{4}$ unc. Umbellæ radii 12 usque ad 3 unc. longæ. Spicæ longæ 1 unc., latæ $\frac{1}{3}$ unc. Spiculæ iis *Eucyperi* subsimiles.

Species Mascarenicæ in herb. Kew. non visæ.

53. C. RIGIDUS, *Vahl, Enum.* ii. p. 309; cf. *Bœck. in Linnæa,* xxxv. p. 540.

54. C. BADIUS, *Bœck. in Linnæa,* xxxvi. p. 375 (*Kunth, Enum.* ii. p. 123, *Mariscus*).—E descr., est C. umbellati, *Benth., forma.*

55. C. NUDICAULIS, *Poir. Encycl.* vii. p. 240; *Bojer, Hort. Maurit.* p. 378.—Anosporum nudicaule, *Bœck. in Linnæa,* xxxv. p. 411.

HELEOCHARIS (§ SCIRPIDIUM) BARONI, n. sp.

Dense cæspitosa, caulibus teretibus haud septatis, spica cylindrica sursum attenuata acuta, glumis basalibus ovato-oblongis obtusis margine late scariosis, glumis floriferis oblongo-lanceolatis obtusis pallide viridibus dorso distincte bicarinatis, setis hypogynis 5–6 hispidis, styli ramis 2–3 hispidulis, staminibus 2–3.

Stems densely cæspitose, erect, pale green, terete, 1½–2 ft. long, $\frac{1}{12}$ in. in diam., continuous inside, the tight-clasping sheaths truncate or oblique at the top. Spikes solitary, erect, cylindrical, ¾–1 in. long, $\frac{1}{12}$ in. in diam., tapering to an acute point. Lowest glumes small, ovate-oblong, obtuse, with a green centre of firm texture and a broad scariose margin, in some of the specimens produced into linear-subulate leaves 1–2 in. long. Flowering glumes oblong-lanceolate, ⅛ in. long, pale green, moderately firm in texture, with a two-ribbed distinct green keel. Hypogynous setæ unequal, retrorsely hispid. Nut only seen immature.—Central Madagascar, *Baron* 2076! A near ally of the common European *H. palustris*, R. Br.

SCIRPUS (§ ISOLEPIS) LYALLII, n. sp.

Perennis, caule tereti sesquipedali, foliis propriis nullis, vaginis basalibus apice obliquis, umbellis 3–8-radiatis folio rigido parvo lineari bracteatis, glomerulis spicularum centrali sessili, reliquis pedunculatis, spiculis multifloris cylindricis, glumis oblongis acutis arcte imbricatis membranaceis castaneis, setis hypogynis nullis, staminibus 3, stylis 3, fructu globoso-triquetro nitido.

Stems 1½ ft. long, erect from a rhizome, slender, terete, with no proper leaves, but a couple of tight-clasping sheaths, castaneous downwards, with a rigid linear point adpressed to the stem. Inflorescence an umbel of few or many rays, bracteated by a rigid erect linear leaf ½–1 in. long; a central globose cluster of 12–20 spikelets sessile, the others peduncled, consisting of fewer spikelets, sometimes only two or three; peduncles not more than 1–2 in. long. Spikelets ¼ in. long, cylindrical, tapering to a point. Glumes membranous, reddish-brown, oblong-navicular, acute, ⅛ in. long, with a green edge and distinct raised 1-nerved keel. Styles 3, long, protruded beyond the tip of the glumes. Nut drab, glossy, ½ lin. long and broad.—Central Madagascar, *Lyall* 359! *Baron*! Habit of *S. lacustris*, but destitute of hypogynous bristles.

Scirpus (§ Isolepis) multicostatus, n. sp.

Dense cæspitosus aphyllus, vaginis brevibus glabris apice truncatis, caule gracili subtereti semipedali vel pedali, spiculis multis parvis oblongis in glomerulum globosum terminalem folio parvo lanceolato bracteatum dispositis, glumis membranaceis oblongo-navicularibus obtusis vel subacutis castaneis arcte imbricatis, setis hypogynis nullis, stylis 3, fructu pallido glabro globoso-triquetro verticaliter multicostato.

A leafless perennial, with slender densely tufted erect stems ½–1 ft. long, with a single short tight-clasping castaneous sheath with a truncate tip. Inflorescence a single globose terminal head ¼–⅓ in. in diam., consisting of 12–20 congested sessile spikelets, bracteated by a rigid lanceolate leaf about as long as itself. Spikelets oblong, 1/12 in. long. Glumes oblong-navicular, ½ line long, membranous, dark chestnut-brown, with a green margin, the lower obtuse, the upper acute. Styles 3, protruded beyond the tip of the glumes. Nut pale, glabrous, with several vertical ribs down each of the three faces.—Central Madagascar, *Baron* 2043! Habit of the St.-Helenan *I. Lichtensteiniana*, Kunth.

Scirpus (§ Oncostylis) trichobasis, n. sp.

Aphyllus, dense cæspitosus, vaginis brevibus brunneis arachnoideis, caule gracillimo tereti, umbellæ radiis 5–6 sæpissime simplicibus folio parvo bracteatis, spiculis oblongo-lanceolatis centrali sessili reliquis pedunculatis, glumis oblongis brunneis arcte imbricatis dorso trinervatis, setis hypogynis nullis, fructu triquetro castaneo, styli ramis tribus.

A densely tufted perennial, with very slender erect wiry stems ½–1 ft. long, clasped tightly at the base by short brown conspicuously pilose sheaths. Umbel terminal, bracteated only by a minute rigid linear leaf, the central spikelet sessile, the others shortly peduncled, usually one, never more than two to a peduncle. Spikelets oblong, acute, ⅙ in. long; glumes oblong, ⅛ in. long, membranous, castaneous, glabrous, with a distinct 3-nerved keel, the lowest obtuse, the others acute. Styles 3, protruded beyond the top of the glume. Nut triquetrous, castaneous, polished, finely granulated.—Central Madagascar, *Baron* 979! This has entirely the habit of *Fimbristylis*, and is nearly allied to *S. capillaris*, L.

Carex emirnensis, n. sp., and C. sphærogyna, n. sp.

These two new species will be figured and described shortly in the 'Journal of Botany.' The first is nearly allied to *C. divisa* and *C. disticha*, the latter to *C. ampullacea*. Both were found by

Mr. Baron on the mountains of the province of Imerina. The former is his 2028 and 2156, and the latter his 2041. [*Vide op. cit.* (1883), pp. 129, 130, t. 238.]

STENOTAPHRUM OOSTACHYUM, n. sp.

Perenne, glabrum, dense cæspitosum, vaginis laxis complanatis, folio parvo lanceolato, spicis parvis oblongis, rhachi utrinque late applanata, spiculis 2–3-jugis, gluma exteriore minuta sterili, interiore oblonga acuta flori æquilonga.

Stems densely intermatted, decumbent and rooting from the nodes of the lower part, the ascending flowering branches not more than 2–3 in. long. Sheaths of the stems $\frac{1}{2}$–$\frac{3}{4}$ in. long, loose, broad, flattened, ciliated at the margin; lanceolate free blade $\frac{1}{2}$–1 in. long, $\frac{1}{8}$–$\frac{1}{6}$ in. broad. Peduncle thickened below the solitary oblong spike, which is not more than $\frac{1}{4}$–$\frac{1}{3}$ in. long, with a rhachis flattened on both sides to a diameter of $\frac{1}{8}$ inch, with 2–3 spikelets on each side inserted in a deep groove. Spikelets erecto-patent, $\frac{1}{12}$ in. long; the outer, sterile glume very minute; the inner as long as the flowering glume, which is oblong, subacute, acutely keeled, without any other ribs.—Central Madagascar, *Baron* 655! A curious little plant, nearly allied to the common cosmopolitan *S. complanatum*, Schrank.

STENOTAPHRUM UNILATERALE, n. sp.

Perenne, glabrum, dense cæspitosum, caule florifero elongato, vaginis laxis complanatis ciliatis, folio lineari, spica elongata cylindrica rhachi unilaterali applanata, spiculis geminis una sessili, altera pedicellata, glumis exteriore minuta emarginata sterili, interiore oblonga acuta flori æquilonga.

Stems densely intermatted, trailing at the base and rooting from several nodes, the ascending flowering branches a foot long. Sheaths of the stem $1\frac{1}{2}$–2 in. long, loose, flattened, densely ciliated on the edge; blade linear, 2–3 in. long. Stems ending in a single compound spike about 3 in. long, with a rhachis flattened on one side of the flowers only to a breadth of a line, the spikelets in laxly disposed pairs along a slender flexuose axis, the inner spikelet of each pair sessile, the outer with a short pedicel, which, however, is adnate to the flattened 1-sided rhachis. Spikelets oblong, acute, 2-flowered, $\frac{1}{6}$ in. long; the outer, sterile glume very short, distinctly emarginate; the inner similar in shape, size, and texture to the flowering glume.—Central Madagascar, *Baron* 1069! A very curious and anomalous species.

ANDROPOGON (§ GYMNANDROPOGON) TRICHOZYGUS, n. sp.

Perennis, dense cæspitosus, caulibus strictis elongatis, foliis paucis elongatis rigidulis lineari-setaceis, paniculæ ramis 2–3 subdigitatis elongatis pilosis, spiculis geminis basi pilorum verticillo præditis, una sessili aristata, altera sterili pedicellata haud aristata, glumis sterilibus lanceolatis rigidulis margine sursum denticulatis.

A densely tufted perennial, with stiffly erect slender glabrous stems 2–3 ft. long, bearing several leaves with long close sheaths and a long narrow linear strongly ribbed almost triquetrous glabrous blade. Panicle of two or three contiguous ascending branches 2–3 in. long; spikelets in pairs with a ring of hairs at the base, one fertile, sessile, with a geniculate awn $\frac{1}{4}$ in. long, the other pedicellate, sterile and awnless. Outer glumes coriaceous in texture, lanceolate-navicular, glabrous, purplish, $\frac{1}{6}$ in. long, not distinctly ribbed except the keel, the margins distinctly denticulate upwards.—Central Madagascar, *Baron* 1807! Allied to the Abyssinian *A. brachyatherum*, Hochst., and Tropical-African *A. Mannii*, Hook. fil.

STIPA MADAGASCARIENSIS, n. sp.

Perennis, dense cæspitosa, glabra, foliis elongatis lineari-setaceis, paniculæ laxissimæ ramis capillaribus ascendentibus, spiculis paucis sessilibus, glumis sterilibus lanceolatis quam flos brevioribus pilis hispidis ascendentibus basi bulbosis instructis, gluma florifera glabra acuminata, palea arista sesquipollicari prædita.

A dense cæspitose perennial, with stems about a foot long. Leaves setaceous, glabrous, moderately firm in texture, the lower ones with a lamina about half a foot long; stem-leaves 2–3, the upper with a tight sheath 3–4 in. long, longer than its lamina. Panicle erect, very lax, 3–4 in. long, the capillary ascending branches bearing few spikelets each, the lateral ones sessile. Sterile glumes brownish, lanceolate-acuminate, clothed with two rows of ascending bristly whitish hairs with a black bulbous base, $\frac{1}{4}$–$\frac{1}{3}$ in. long. Flowering glume lanceolate, acuminate, glabrous, $\frac{1}{3}$ in. long. Pale much smaller, produced into an awn $1\frac{1}{2}$ in. long, bent at the middle and twisted in the lower half.—Central Madagascar, *Baron* 2022! Allied to *S. Neesiana*, Trin., and *S. eminens*, Cav. Adds this well-known and widely spread genus to the flora of the island.

LOPHATHERUM GEMINATUM, n. sp.

L. caule gracillimo elongato ramoso, vaginis elongatis margine dense ciliatis, foliis linearibus patulis glabris, paniculæ ramis distantibus erecto-patentibus, spiculis patulis sæpissime geminis, una sessili, altera pedicellata.

A perennial, with slender erect glabrous stems about 3 feet long, branched low down. Sheaths 2–3 in. long, densely ciliated on the edges towards the top; blade acuminate, moderately firm in texture, 4–6 in. long, $\frac{1}{4}$–$\frac{1}{2}$ in. broad, glabrous both on the surfaces and margin. Panicles several to a stem, terminal and from the axils of the leaves, reaching a foot in length, with distant erecto-patent branches, the lower 2–3 in. long. Spikelets usually in pairs, spreading, lanceolate, glabrous, $\frac{1}{6}$ in. long, one sessile, the other shortly pedicellate. Glumes lanceolate, acute, glabrous, not aristate, the two outer about half as long as the spikelet, 5-nerved on the back.—Central Madagascar, *Baron* 1061! Two species of this genus are already known, which are confined to the Himalayas, China, Japan, and the Malay archipelago.

BROMUS DISSITIFLORUS, n. sp.

Perennis, glaber, caule elongato, foliis paucis elongatis anguste linearibus, paniculæ laxissimæ ramulis paucis ascendentibus, spiculis paucis pedicellatis 7–8-floris, glumis sterilibus parvis lanceolatis, floribus segregatis, gluma florifera lanceolata 5-nervata breviter aristata.

A perennial, glabrous in all its parts, with slender erect stems 2–3 ft. long. Basal leaves several, with a linear setaceous convolute lamina reaching a foot in length. Stem-leaves about four, with tight sheaths 2–3 in. long and a linear blade sometimes half a foot long. Panicle very lax, nearly a foot long, with few distant solitary ascending branches, bearing each 2–4 spikelets, the side ones on ascending pedicels $\frac{1}{2}$–$\frac{3}{4}$ in. long. Spikelets $\frac{3}{4}$ in. long; sterile glumes lanceolate, unequal, $\frac{1}{4}$–$\frac{1}{6}$ in. long; flowers erecto-patent, distinctly separated from each other on the slender glabrous axis; flowering glume lanceolate-navicular, $\frac{1}{3}$ in. long, green, glabrous, obscurely 5-ribbed, narrowed gradually into a very short terminal awn.—Central Madagascar, *Baron* 2092! Allied to *B. pectinatus*, Thunb., and *B. scabridus*, Hook. fil., and amongst European species to *B. sterilis*.

BROMUS ARRHENATHEROIDES, n. sp.

Perennis, glaber, caule elongato, foliis paucis elongatis lineari-setaceis, paniculæ laxæ ramis multis ascendentibus, spiculis paucifloris lateralibus sessilibus vel breviter pedicellatis, glumis sterilibus magnis lanceolatis tri-

nervatis, floribus laxis, gluma florifera lanceolata 7-nervata profunde bifida arista elongata geniculata instructa.

An erect perennial, with the habit of *Arrhenatherum avenaceum*. Basal leaves with a slender setaceous lamina a foot or more long. Stems 2 feet long, with about three leaves, each with a long close sheath and a long narrow linear free blade. Panicle half a foot long, with numerous short ascending capillary branches, the lower with five or six spikelets. Spikelets $\frac{1}{3}$ in. long, exclusive of the awns; empty glumes lanceolate, acute, 3-nerved, $\frac{1}{6}$–$\frac{1}{4}$ in. long; rhachis pilose; flowers not more than 3 fertile, with a distinctly 7-nerved deeply bifid flowering glume with a patulous geniculate awn longer than itself springing from the notch.—Central Madagascar, *Baron* 2081!

BROMUS AVENOIDES, n. sp.

Perennis, glaber, caule elongato, foliis paucis elongatis anguste linearibus, paniculæ laxissimæ ramulis paucis ascendentibus, spiculis 5–6-floris pedicellatis, glumis sterilibus magnis lanceolatis, floribus laxis, gluma florifera lanceolata 7-nervata profunde bifida arista geniculata elongata instructa.

A tufted perennial, glabrous in all its parts, with slender erect glabrous stems 2–3 ft. long. Basal leaves with a setaceous lamina a foot long; stem-leaves about three, with long close sheaths and a long free narrow linear lamina. Panicle very lax, half a foot long, with few slender ascending capillary branches, the lower 2–3nate, bearing three or four spikelets, all distinctly stalked. Spikelets $\frac{5}{8}$–$\frac{3}{4}$ in. long exclusive of the awns; empty glumes lanceolate, acute, 3-nerved, $\frac{1}{4}$–$\frac{1}{3}$ in. long; flowers usually five or six; rhachis slender, densely pilose; flowering glume lanceolate-navicular, deeply bifid, glabrous, distinctly 7-nerved, $\frac{1}{3}$ in. long, bearing an erecto-patent or spreading geniculate awn above $\frac{1}{2}$ in. long from the bottom of the notch.—Central Madagascar, *Baron* 2034! Habit of the European *B. patulus*, Mert. & Koch. This species and the last are remarkable in this large genus by their deeply bifid flowering glumes.

NASTUS BORBONICUS, *Gmel.*, var. EMIRNENSIS.

This Bamboo, which is common in the forests of Central Madagascar, and of which Dr. Parker has procured fine specimens in flower, differs only from the type of the species (which is common in the uplands of the interior of Bourbon) by its more slender habit, narrower leaves, and smaller spikelets. The Bourbon plant is figured in Bory's 'Voyage,' tab. 12, under the name of *Bambusa alpina*.

FILICES.

CYATHEA SEGREGATA, n. sp.

C. frondibus amplis tripinnatis utrinque glabris facie viridibus dorso glaucis, rachidibus stramineis inermibus, pinnis oblongo-lanceolatis, pinnulis sessilibus lanceolatis, segmentis tertiariis lanceolatis segregatis, fertilibus crenatis, venulis 8–10-jugis profunde furcatis, soris costalibus, involucro membranaceo, ore truncato.

Fronds ample, tripinnate, moderately firm in texture, green on the upper surface, glaucous beneath, the rhachises quite without either prickles or paleæ. Pinnæ about a foot long in the specimens. Pinnules contiguous, sessile, lanceolate, 2–2½ in. long, $\frac{5}{8}$–$\frac{3}{4}$ in. broad, cut down to the rhachis into lanceolate tertiary segments $\frac{1}{12}$ in. broad, with a distinct space between each equal in breadth to a segment, the fertile portion distinctly toothed. Veinlets in 8–10 pairs in the lower segments, distinct, deeply forked. Sori globose, confined to the lower part of the segments, filling up the whole space between midrib and margin. Involucre glabrous, membranous, truncate. Receptacle glabrous.—Central Madagascar, *Baron* 997!

CYATHEA POLYPHLEBIA, n. sp.

C. frondibus amplis tripinnatis utrinque viridibus glabris, rhachidibus brunneolis inermibus, pinnis oblongo-lanceolatis, pinnulis sessilibus lanceolatis, segmentis tertiariis lineari-oblongis obtusis obscure crenulatis, venulis 10–12-jugis profunde furcatis, soris costalibus, involucro membranaceo, ore truncato.

Fronds ample, tripinnate, moderately firm in texture, green and glabrous on both surfaces; rhachises brownish, without any prickles or paleæ. Pinnæ 1½ ft. long, 5–6 in. broad. Pinnules crowded, sessile, lanceolate, $\frac{5}{8}$–$\frac{3}{4}$ in. broad, cut down to the rhachis into crowded obscurely toothed tertiary segments $\frac{1}{12}$ in. broad. Veins crowded, distinct, deeply forked. Sori confined to the lower half of the tertiary segments, filling up the whole space between midrib and margin. Involucre cup-shaped, hemispherical, membranous, glabrous, truncate. Receptacle glabrous.—Central Madagascar, *Baron* 440! Both this and the last species are nearly allied to *C. excelsa*, Sw., and *C. Hildebrandtii*, Kuhn.

SALVINIA HASTATA, *Desv. in Ann. Soc. Linn. Par.* vi. 177?

Stems wide-creeping, sending down abundant tufts of root-fibres from the nodes, clothed with small blackish linear crisped membranous lanceolate paleæ. Petiole under a line long. Fronds cordate-ovate, flat, membranous, $\frac{1}{2}$–$\frac{3}{4}$ in. long, $\frac{3}{8}$–$\frac{1}{2}$ in. broad, pale green above and rugose with close raised points, dark green beneath, and matted with dense short soft hairs, the apex conspicuously emarginate with two semiorbicular lobes, the basal lobes shallow and broadly rounded, and a distinct midrib running from the top of the petiole to the base of the apical sinus. Conceptacles not seen.—In fresh water near the east coast, *Baron* 1569!

On the Joint and Separate Work of the Authors of Bentham and Hooker's 'Genera Plantarum.' By G. Bentham, F.R.S.

[Read April 19, 1883.]

Since the completion of our 'Genera Plantarum' we have been asked to distinguish which are the parts which we severally took in it, and to publish a list of the Orders which each of us had worked up. We wish, however, that the whole may be considered as the joint production of both of us. It is indeed the only joint work in which I have ever been engaged. I very early saw the diminished responsibility and other inconveniences of partnership botany, and during my long working-time always refused entering into any such without the special conditions offered on the present occasion. It is true that in some catalogues I appear as joint author of botanical papers or work, but always by some error. Some of Œrsted's papers on the botany of Central America have been quoted, and perhaps entitled, as by Bentham and Œrsted, when they are really Œrsted's, though he incorporated in them the determinations and descriptions of his specimens with which I had supplied him. Apart from these descriptions, the papers are in Danish, a language with which I was once familiar as to reading, but in which I never wrote. Then, again, the 'Flora Australiensis' is sometimes quoted as the joint work of Bentham and Mueller, when it is entirely and exclusively mine, with the assistance indeed, but not the "cooperation," of Baron v. Mueller, this assistance being of precisely the same description as that which I derived from the herbarium and detailed MS. descriptions of Robert Brown, from the herbarium and notes of A. Cunningham, from the rich herbaria of Kew, from the 'Flora Tasmanica' and other published works of the Hookers, as well as from the numerous instructive notes of the Hookers, of Planchon, and others who had worked in the herbarium. In the case of Baron v. Mueller, however, the extreme liberality with which he gave up in my favour his own projects for a general Flora of Australia, and the great value for my purposes of the very numerous specimens of each species which he had collected into the Melbourne herbarium, the whole of which he unreservedly lent to me, seemed to me to demand a special recognition in the titlepage of the 'Flora,' which has thus been misconstrued into an indication of cooperation. A joint work was impossible where consultation was prevented by the great distance which separated us; to procure an answer to the simplest question required four or five months. The descriptions in the 'Flora' are drawn up from the actual examination of specimens, generally checked by a comparison with the MS. notes and printed works above referred to, amongst which Baron v. Mueller's 'Fragmenta,' regularly transmitted to me as printed, bear a prominent part. Nothing in my work is merely copied, except in a very few cases where the material at my disposal was insufficient, and where I have specially referred to my authority. The method and classification are entirely mine, though of course derived from general and other published botanical works.

The case of the 'Genera Plantarum' was very different. Some six- or seven-and-twenty years ago, when my botanical workshop had become firmly established in the Kew Herbarium and my intercourse with Sir Joseph (then Dr.) Hooker, always very intimate, had become more constant, we both of us felt the inconvenience of the want of a Genera Plantarum founded on actual observation to replace the already antiquated ones of Endlicher and Meissner, both of which, especially the latter, had been in a great measure mere compilations, and each of us had formed the project of endeavouring to supply the deficiency; but it appeared almost too vast an undertaking to be carried out by a single hand; and Hooker proposed as the best chance of seeing the work brought to a successful issue, that we should join our forces. Notwithstanding my normal aversion to partnership botany, I saw that here there was nothing to fear from collision, and but little from any permanent separation. I had always found that I could perfectly coincide with Hooker in his views in scientific botany, or at any rate readily defer to them on consideration. I saw that there were many natural orders in which I should, alone, severely miss his great experience in the study of living tropical and southern extratropical vegetation and his facilities for availing himself of the treasures of the Kew planthouses and museum, whilst there were other orders, especially those which comprise very numerous small genera, the almost mechanical details of which would require more persevering and *uninterrupted* work in the herbarium and library than Hooker's official and other duties would always allow him to carry on. I therefore readily agreed to his proposal; and after much deliberation and consultation with botanical friends in whose judgment we had great confidence, we matured our plans, to which we have adhered during the quarter of a century which the elaboration of our 'Genera Plantarum' has required.

We necessarily divided the orders between us for their working up in detail; but we always consulted together when any doubt or difficulty occurred; and the ordinal characters, general observations, and subdivisions and generic arrangements prepared by each of us were almost invariably submitted to the other in manuscript for study and comment before being finally revised for press. When the printing commenced, the first proofs were carefully read through by both of us, as well as by our friend the Rev. M. J. Berkeley, who kindly undertook to go over them chiefly for their latinity, in which we both of us felt deficient. These proofs were again gone through by the one of us who had specially worked up the order, in order to check the references, to which process we paid special attention. The revises were read by one, and very frequently by both, of us before finally releasing them for press.

With regard to the repartition of the Orders, those of the first volume, the Polypetalæ, were pretty equally divided between us. Whilst I took the first few orders, Hooker worked up the Cruciferæ, Capparideæ, and Resedaceæ; and I followed him with the remainder of the Thalamifloræ, whilst he elaborated the whole of the long series of Discifloræ with the exception of the Lineæ, Humiriaceæ, Geraniaceæ, and Olacineæ, which had fallen to my lot. In the Calycifloræ I naturally took up the Leguminosæ, with which I was already very familiar, and Hooker all the remaining orders except the Myrtaceæ, Umbelliferæ, and Araliaceæ.

The first part of the second volume was chiefly taken up by the two important orders Rubiaceæ and Compositæ. Hooker devoted a great deal of time to the former (and their close allies the Caprifoliaceæ) requiring much scientific study, whilst I endeavoured to reduce to some order the intricate, almost endless details of the innumerable closely allied and often scarcely distinct genera of Compositæ. The second part of the volume comprised the great mass of Gamopetalous orders, which I began with the Campanulaceæ and their immediate allies, followed by Hooker with the Vacciniaceæ, Ericaceæ, Epacrideæ, and their allies, the Myrsineæ, Primulaceæ, and a portion of the Sapotaceæ, when the pressure of official and other avocations with occasional absences prevented him for a time from a continuous detailed elaboration of genera, and the remaining Gamopetalous orders all devolved upon me.

In the third volume Hooker resumed active work. The first part, Monochlamydeæ, began with the series of curvembryous orders elaborated by him, from Nyctagineæ to Batideæ. He also prepared the Nepenthaceæ, Cytinaceæ, and Balanophoreæ as a *résumé* of the important monographs he had previously published. I worked out the remaining orders, amongst which the Euphorbiaceæ and Urticeæ took up the most time. Hooker was to have done the Gymnospermeæ, of which he had so much practical knowledge in a living state; but unfortunately he was at that time again much engaged in other duties, and I was obliged to satisfy myself with consultations on points which appeared to me to be doubtful; and two or three errors have crept in which were overlooked in the correction of the proofs, but adverted to in the Addenda et Corrigenda. The second part of the third volume, the Monocotyledons, appeared at first so formidable an undertaking, that in the uncertainty of being enabled to carry it through to the end, we determined to commence with the most difficult orders. Hooker attacked the Palms, for which I felt totally incompetent; and notwithstanding the great facilities derived from his previous knowledge and close study of the copious materials supplied by the museums and living collections of Kew, he found that they required much more time than he had at first calculated upon, besides a great deal of foreign correspondence with Wendland, Beccari, and others who had more or less worked at the order. I in the mean time devoted more than a twelvemonth's constant and uninterrupted labour to the Orchideæ, and at least as much to the Gramineæ. We then divided between us the remaining Monocotyledonous orders, in which our work was often materially assisted, but never superseded, by previous monographs. Hooker prepared the Nudiflorous orders (Aroideæ and allies) and the Apocarpæ (Alismaceæ, Naiadaceæ, and allies), the others falling to my share.

We hope that it will be distinctly understood that throughout the work, where there is no special indication to the contrary, our characters have been drawn up from the actual examination of specimens; and for some further details as to the plan of the work, we would refer to my Report read in Section Biology of the meeting of the British Association at Belfast in 1874.

On the Synonymy of the Orchidaceous Genus *Didymoplexis*, Griffith, and the Elongation of the Pedicels of *D. pallens* after Flowering. By W. Botting Hemsley, A.L.S.

[Read February 15, 1883.]

(Plate XXVIII.)

In 1844 William Griffith published* a detailed description of an orchid, found near Serampore, in Lower Bengal, which he regarded as the type of a new genus, and named *Didymoplexis pallens*. A few years later Blume† published his genus *Leucorchis*, describing one species, *L. sylvatica*, a native of Java. In 1851 Wight figured‡ and described an orchid, collected in Coorg by Jerdon, under the name of *Apetalon minutum*. The same year McClelland§ published Griffith's plant under his original manuscript name of *Arethusa ecristata*.

Whether these three plants represent only one species is perhaps not quite certain; but there is no doubt about their belonging to the same genus. Lindley, in a manuscript note in his herbarium, suggests that *Leucorchis* of Blume is the same genus as *Apetalon* of Wight; and Mr. Bentham* reduces them to one genus bearing the former name, whilst *Didymoplexis* is doubtfully referred by the same botanist to *Pogonia.* Kurz† had already stated that *Didymoplexis pallens* and *Arethusa ecristata* were the same plant; and a comparison of the figures verifies his statement. He also cites *Apetalon minutum*, Wight, as a synonym of the same species, which it may well be; for although the figures do not agree, especially in the parts of the flower, Wight's specimens are not distinguishable from Griffith's plant, and the drawing in Wight's 'Icones' is evidently a very rude one, whilst Griffith's figures of the flowers are merely diagrammatic. It is probable, however, that Kurz merely followed Reichenbach in this part of the synonymy, though he may have independently arrived at the same conclusion.

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* Calcutta Journal of Natural History, iv. p. 383, t. 17.

† 'Museum Botanicum Lugduno-Batavum,' i. p. 31 (1849), and 'Les Orchidées de l'Archipel Indien,' p. 146, cum ic.

‡ 'Icones Plantarum Indiæ Orientalis,' v. t. 1758.

§ Posthumous papers of W. Griffith, "Notulæ ad Plantas Asiaticas," iii. p. 378, and "Icones Plantarum Asiaticarum," tt. 343 & 344.

Dr. Reichenbach‡ not only reduces *Apetalon minutum* to *Didymoplexis pallens*; he goes further, and refers the latter to the genus *Epiphanes* of Blume, as *Epiphanes pallens*, Rchb. f. Nevertheless I think Endlicher§, Lindley‖, Miquel¶, and Bentham** are unquestionably right in reducing *Epiphanes javanica* to *Gastrodia*; and Blume†† was of the same opinion. The perianth is essentially that of a typical *Gastrodia*; that is to say, the three sepals and the two lateral petals are united nearly to the top except the opposite edges of the two lateral sepals, which are free, so that the whole forms an envelope fissured to the base beneath the labellum; whilst in *Didymoplexis* the perianth is somewhat two-lipped with the labellum inside.

Mr. Bentham‡‡ defines them thus:—"Sepalum posticum cum petalis in labium superum trifidum, lateralia in labium inferum bifidum connata. Labellum latissimum indivisum.—*Leucorchis* [=*Didymoplexis*]. Sepala cum petalis in tubum late ventricosum quinquelobum antice fissum connata. Labellum indivisum.—*Gastrodia*."

Kurz§§ still further confused the synonymy of *Didymo-*

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[*] Bentham et Hooker, 'Genera Plantarum,' iii. p. 616.

[†] Seemann's Journal of Botany, 1866, p. 40.

[‡] Seemann, 'Flora Vitiensis,' p. 296.

[§] 'Genera Plantarum,' i. p. 212.

[‖] 'Genera and Species of Orchidaceous Plants,' p. 384.

[¶] 'Floræ Indiæ Batavæ,' iii. p. 717.

[**] Journal of the Linnean Society, xviii. p. 349.

[††] 'Les Orchidées de l'Archipel Indien,' pp. 141 & 145, t. 52.

[‡‡] Bentham and Hooker, 'Genera Plantarum,' iii. p. 485; 1226.

[§§] Seemann's Journal of Botany, 1866, p. 40.

plexis pallens by reducing it to the very different *Gastrodia javanica*, Endl., syn. *Epiphanes javanica*, Blume, which, in addition to the structural differences pointed out, has flowers nearly four times as large. There is a second species of *Didymoplexis*, which was collected in the Fiji Islands by the late Dr. Seemann, and described by Reichenbach* under the name of *Epiphanes micradenia.*

But, before tabulating the synonymy of the genus, I wish to call attention to the very remarkable elongation of the pedicels of *Didymoplexis pallens* after flowering, as represented in the accompanying drawing by Miss Smith. In the flowering stage the pedicels are no longer than the flowers, and the whole plant usually less than 6 inches in height. But after flowering, the pedicels grow out sometimes as much as a foot in length, increasing at the same time in thickness, so that a single pedicel becomes twice as large as the whole plant was during the flowering stage. These long pedicels are quite erect; and it seems that only the pedicels of the flowers which have been fertilized possess the singular property of elongating. Griffith does not mention it; and the only record I have found of it is by Kurz†. *D. pallens* is apparently not uncommon in Lower Bengal, growing about clumps of bamboos and in leafy wet spots; and the only use of this extension of the pedicel that I can suggest is that it carries up the ripening fruit above the decaying vegetable matter in which the plant grows.

I should mention that it is a whitish leafless plant having a tuberous root, and is most likely a saprophyte or semisaprophyte. Griffith states that it grew about clumps of bamboos in the villages around Calcutta, whence it was introduced into the Botanic Gardens. The Coorg specimens upon which Wight founded his *Apetalon minutum* were also found under a clump of bamboos. These are all in a young condition, though in some of them the lower pedicels are beginning to elongate; and I also find traces of the same thing in the Fiji species. I do not remember having seen quite this kind of adaptation in any other plant. Of course there are many plants the peduncles or pedicels of which elongate after the flowers have fallen, notably those which, like *Arachis hypogæa*, bury their fruit underground, where it ripens.

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* Seemann's 'Flora Vitiensis,' p. 295.

† Seemann's Journal of Botany, 1866, p. 41

The synonymy of the two species is as follows:—

1. Didymoplexis pallens, *Griff.* — Leucorchis sylvatica, *Blume.*—Apetalon minutum, *Wight.*—Arethusa ecristata, *Griff.* —Epiphanes pallens, *Rchb. f.*—Arethusa bengalensis, *Herb. hort. bot. Calc.*

2. Didymoplexis micradenia, *Hemsl.*— Epiphanes micradenia, *Rchb. f.*

DESCRIPTION OF PLATE XXVIII.

Didymoplexis pallens, Griffith.

Fig. 1. A plant in flower, natural size.
2. Upper portion of a plant bearing two mature capsules on elongated pedicels, which are longer and thicker than the whole plant at the time of flowering; natural size.
3. Front view of a flower, enlarged.
4. Side view of a flower, enlarged.

On the Outer Peridium of *Broomeia*. By George Murray, F.L.S., Assistant, Department of Botany, British Museum, and Lecturer on Botany, St. George's Hospital.

[Read February 15, 1883.]

(Plate XXIX.)

The genus *Broomeia* (Gasteromycetes) was founded by the Rev. M. J. Berkeley in 1844 (Hook. Lond. Journ. Bot. vol. iii. p. 193); and the species *B. congregata*, Berk., which then alone represented it, is the subject of the present note. The specimens used by Mr. Berkeley were brought from the district of Albany, Cape of Good Hope, where they were found by Mr. J. Backhouse. They consist each of a mass of mature individuals congregated on a corky stroma common to the whole mass. These individuals possess but one peridium; and Mr. Berkeley, doubtless recalling the fact that in *Geaster*, the nearest ally of *Broomeia*, two peridia are present, treated the corky stroma as the homologue of an outer peridium. Specimens collected since then by Prof. MacOwan and others show precisely the same appearances. Another species, *B. guadalupensis*, Lév., was added to the genus by Léveillé in 1848 (Ann. Sci. Nat. 3 sér. tom. ix. p. 129). I have not been able to examine any specimen of this species; but all notice of a true external peridium is absent from the description.

In 1879 Capt. Een brought back from Damara-Land among his collections a few specimens of *B. congregata*, which he divided between the British Museum and Kew. They were exhibited at the time to the Society by Mr. Thiselton Dyer, who called attention to the interest of the specimens. When collected they had not reached maturity; and I venture to think they afford an explanation of the mode of growth of this interesting fungus. The first point to be noted is the presence on them of a definite outer peridium of a beautiful white colour still covering the immature individuals round the edge of the mass, but apparently in the course of peeling off (figs. 1 and 2). It is joined to the stroma round the margin, and reaches from it over the tops of the inner peridia towards the centre of the group. Each individual is not completely invested by it at all points, but it extends over the tops as one continuous membrane common to the whole mass, fitting into the depressions between the inner peridia, and, in the case of nearly mature individuals, easily separable from them. On very young individuals, at the margin it is closely united with the inner peridium; but examination with the microscope shows a line of weakness between them, destined to become the line of separation. In these cases it penetrates downwards between the very young inner peridia, and meets the lip of the cup-shaped depression in the stroma in which each individual is seated. Directly over the top of the mature individuals, in the middle of the mass, it will be found that the outer peridium has disappeared. The direction of growth of the mass is therefore, I take it, centrifugal. The individuals in the centre first become ripe; and in each case, by the expansion of the inner peridium, the part of the outer one directly above it peels off to permit the discharge of the spores from the beautifully fimbriated orifice at the apex of the inner peridium. In the mean time young individuals arise round the margin, and remain under the covering of the outer peridium until they, too, attain maturity and burst it off. When the whole are mature (fig. 5), as in the specimens hitherto brought to this country, the outer peridium has already disappeared and left no trace of its existence behind.

The microscopic structure of the outer peridium calls for no special description. It consists of a mass of very densely interwoven hyphæ similar to those described by Mr. Berkeley a forming the stroma, only more densely compacted together.

It will be remembered that in *Geaster*, the nearest ally of this plant, the individuals appear singly, and each is furnished with both peridia, the outer one of which splits perpendicularly along definite lines of fission, each segment folding back and the whole forming the stellate support.

DESCRIPTION OF PLATE XXIX.

Fig. 1. View from above, showing:—*a*, remains of outer peridium; *b*, inner peridia.
2. Vertical section:—*a*, outer peridium; *b*, inner peridia.
3. View of inner peridia, *b*, with fragment of outer peridium, *a*, still adhering, × 2.
4. Spores, × 780 diam. After Mr. Berkeley.
5. View of mature inner peridia when outer peridium has disappeared. After Mr. Berkeley.

On the Diatoms collected during the Arctic Expedition of Sir George Nares.

By P. T. Cleve, Professor of Chemistry in the University, Upsala. (Communicated by Sir J. D. Hooker, V.-Pres. L.S.)

[Read April 9, 1883.]

Through the kindness of Prof. Oliver I have got for examination several samples containing diatoms, and collected during the Arctic Expedition of Sir George Nares. Among them were only four gatherings containing diatoms in such number that I was able to subject them to the usual cleaning process necessary for getting the valves in a state suitable for examination. Among these four samples one from Cape Sabine (lat. 78° 40′ N.) contained freshwater species, the other three, from Bessel's Bay, Mushroom Point, and Discovery Bay, contained marine forms. The sample from Discovery Bay, which had been collected on the ice, consisted almost exclusively of a single species, *Melosira nummuloides*, var. *hyperborea*, Grun., but contained also sparingly some other diatoms.

The algæ collected during the expedition have already been examined by Dr. Dickie*, who also has given a list of the diatoms. The freshwater species found in the gathering from Cape Sabine were the following:—

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* Journ. Linn. Soc., Bot. (1878) vol. xvii. p. 6.

Cymbella rupicola, Grun. (A. Schm. Atl. pl. lxxi. figs. 70–71). A small variety; length 0·027 millim., breadth 0·0055 millim. Dorsal striæ 12, and ventral 16 in 0·01 millim.

C. Botellus, Lagerstedt.
Achnanthidium flexellum, Bréb.
Achnanthes marginata, Grun.
Gomphonema angustatum, Kütz.

Navicula viridula, Kütz. Length 0·05 millim; breadth 0·01 millim. Striæ 12 in 0·01 millim.

N. rhynchocephala, Kütz.
N. cryptocephala, Kütz.

N. falaisiensis, Grun.? Length 0·033 millim; breadth 0·006 millim. Striæ 16 in 0·01 millim.

N. perpusilla, Grun.

Ceratoneis arcus, Kütz. Very common. Probably *Eunotia arcus* in the list of Dickie.

Synedra Vaucheriæ, Kütz., var. *capitellata*, Grun. Striæ 18 in 0·01 millim.

S. pulchella, var. *saxonica*, Kütz.? Length 0·05 millim.; breadth 0·006 millim. Striæ 20 in 0·01 millim.

Diatoma tenue, var. *elongata*, Lyngb. Very common.

Denticula tenuis, var. *frigida*, Kütz.

Surirella ovata, Kütz.
Cyclotella antiqua, W. Smith.

In the gathering from Mushroom Point were occasionally two freshwater species:—

Navicula pusilla, W. Sm.
N. vulpina, Kütz.

In all 19 different freshwater species were found.

Dr. Dickie enumerates the following not found by myself:—

Cymbella maculata, Kütz.
Eunotia arcus, Sm.
E. diodon, Ehrenb.
Meridion circulare, Ag.
Navicula ambigua, Ehrenb.
N. borealis, Ehrenb.
Navicula firma, Kütz.
N. globiceps, Greg.
N. mesolepta, Ehrenb.
N. minutula, Sm.
Stauroneis anceps, Ehrenb.

Surirella constricta (without the name of the author, *S. constricta*, W. Sm.,=*S. Smithii*, Ralfs).

With this addition the freshwater species attain the number of 31.

The marine species found by me are the following:—

Amphora cymbifera, Greg. Mushroom Point.

A. lineata, Greg. Bessel's Bay.

A. proteus, Greg. Mushroom Point, Bessel's Bay.

Gomphonema kamtschaticum, Grun., forma *minor*. Mushroom

Point, Bessel's Bay. Length 0·03 millim.; breadth 0·005 millim. Striæ 18 in 0·01 millim.

Rhoikosphenia curvata (Kütz.). Bessel's Bay.

Achnanthes subsessilis, Ehrenb., var. (*Achnanthidium arcticum*, Cl.). Mushroom Point.

A. coarctata, Bréb. Mushroom Point.

A. delicatula, Kütz. Bessel's Bay.

A. grœnlandica, Cl. Bessel's Bay. Very common.

Cocconeis costata, Greg. Bessel's Bay; Mushroom Point.

C. finmarchica, Grun. Bessel's Bay.

C. scutellum, Ehrenb., and var. *stauroneiformis*, W. Sm. Bessel's Bay and Mushroom Point.

C. distans, Greg. Mushroom Point.

C. decipiens, Cl. Bessel's Bay.

C. arctica. Bessel's Bay.

Stauroneis aspera, var. *intermedia*, Grun. Bessel's Bay; Mushroom Point.

S. spicula, Dickie. Discovery Bay.

Schizonema Grevillei, Ag. Bessel's Bay.

Navicula septentrionalis, Cl. (A. Schm. Atl. pl. vi. fig. 37). Mushroom Point.

Navicula digitoradiata, Greg. Mushroom Point.

N. Smithii, Bréb. Mushroom Point.

N. Lyra, var. *elliptica*. Mushroom Point.

N. directa, W. Sm. Mushroom Point.

N. bomboides, var. *media*, Grun. Mushroom Point.

N. latefasciata, Grun. Mushroom Point.

N. subdivisa, Grun. Mushroom Point.

N. peregrina, Kütz. Mushroom Point.

N. interrupta, Kütz. Mushroom Point.

N. Pinnularia, Cl. Mushroom Point.

N. littoralis, Donk. Mushroom Point.

N. subinflata, Grun. Bessel's Bay.

Amphiprora paludosa, Sm., var. Discovery Bay.

A. duplex, Donk. Discovery Bay.

Synedra kamtschatica, Grun. Bessel's Bay Mushroom Point.

—— ——, var. *minor*, Grun. Bessel's Bay.

S. nitzschioides, Grun. Mushroom Point; Bessel's Bay. Length 0·06 millim.; breadth 0·003 millim. Striæ 11 in 0·01 millim.

S. commutata, Grun, var. *septentrionalis*, Grun. Mushroom Point. Striæ 12 in 0·01 millim.

S. affinis, var. Length 0·27 millim.; breadth 0·0009 millim. Striæ 19 in 0·01 millim. Bessel's Bay.

S. affinis, var. *tabulata*, Kütz. Length 0·115 millim.; breadth 0·005 millim. Striæ $9\frac{1}{2}$ in 0·01 millim. Bessel's Bay.

Fragilaria oceanica, Cl. (=*F. arctica*, Grun.). Bessel's Bay.

F. islandica, Grun., var. With larger area, and with 12 striæ in 0·01 millim. Bessel's Bay.

Licmophora Jurgensii, Ag. Bessel's Bay.

Grammatophora islandica, Ehreb. Striæ 14 in 0·01 millim. Bessel's Bay.

G. arctica, Cl. Bessel's Bay.
Striatella delicatula, Kütz. Bessel's Bay.
Rhabdonema arcuatum (Ag.).
R. Torellii, Cl.
Nitzschia marginulata, Grun. Mushroom Point.
N. glacialis, Grun. Discovery Bay.
N. lævissima, Grun. Discovery Bay.
N. vitrea, var. Discovery Bay.
Biddulphia aurita (Lyngb.). Bessel's Bay; Mushroom Point.
Triceratium arcticum, Btw., and forma *Zygoceros Balæna*, Ehrenb. Bessel's Bay.
Hyalodiscus scoticus (Kütz.), Grun. Bessel's Bay; Mushroom Point.
Podosira hormoides, Mont. Mushroom Point.
Melosira Borreri, Grev., var. Bessel's Bay.
M. mediterranea, Grun., var.? Mushroom Point.
M. nummuloides, var. *hyperborea*, Grun. Discovery Bay.
Thalassiosira Nordenskiöldii, Cl. Cape Sabine.
Coscinodiscus subglobosus, Grun. Cape Sabine.

In all 59 species. Many among them have not been indicated in the list of Dr. Dickie, which contains on the other side several species not observed by me. These are:—

Achnanthes longipes. I have not found this species in the Arctic Sea, so the determination may perhaps be doubtful. Dr. Dickie has not indicated any locality for this species.

Amphiprora longa, Cl.
A. nitzschioides, Cl. = *Nitzschia Amphiprora*, Grun.
Amphora affinis (no author and no locality).
A. Eunotia, Cl.
A. lanceolata, Cl.

A. Leighsmithiana, O'M. (Probably *A. Erebi*, Ehrenb., and *A. cymbifera*, p. p., forms with costate striæ.)
Chætoceras borealis, Bail.
C. decipiens, Cl.
Cocconeis glacialis = *Navicula glacialis*, Cl.
Coscinodiscus centralis, Ehrenb.
C. excentricus, Ehrenb.
C. radiatus, Ehrenb.
C. subtilis, Ehrenb.
Fragilaria striatula, Lyngb.
Navicula arctica, Cl.
N. didyma, Ehrenb.
N. fortis, Greg.
N. liber, W. Sm.
N. Smithii, Bréb.
N. subsalina, Donk.
Nitzschia angularis, W. Sm.
N. Closterium, Ehrenb.
N. sigma, Kütz.
Melosira sulcata, Ehrenb. (*Orthosira marina*, W. Sm.).
Pleurosigma angulare.
P. longum, Cl.

Podosphenia gracilis, Ehrenb. (May be *Licmophora Jurgensii*, Ag., which is common in the gathering from Bessel's Bay.)

Raphoneis Quernerensis, Grun.

Synedra fulgens, Grev.

S. superba, W. Sm. These two species I have never observed in the arctic seas. A small form of *S. superba* (var. *minor*, Grun.) has been seen by Mr. Grunow in a gathering from Finmarken. I think the determinations may probably be incorrect.

The number of additional species found by Dr. Dickie, but not by myself, amounts to 27, *Achnanthes longipes*, *Podosphenia gracilis*, *Synedra fulgens*, and *S. superba* not being counted. The total number of marine diatoms from these high latitudes amounts then to 86.

On *Cinchona Calisaya*, var. *Ledgeriana*, How., and *C. Ledgeriana* (Moens). By John Eliot Howard, F.R.S., F.L.S.

[Read May 3, 1883.]

In the year 1866 I communicated to the Botanical Congress held in London some observations on the present state of our knowledge of the genus *Cinchona*, in which I quoted * Mr. Markham's observation that "the *Cinchona Calisaya*, the most famous of all the South-American bark-trees, and which in its native forests is alike the most beautiful and the richest in quinine, has not been a success in India." "I was grieved," Mr. Markham says, "to see the plants of this species only 5 feet 10 inches high and $6\frac{1}{2}$ inches in girth at an age of three years; while their stunted and shrubby appearance, with dim-coloured leaves, is as different as possible from the glorious *Calisaya* of the Caravayan forests."

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* 'Report of Proceedings of the Internat. Horticult. Exhib. and Bot. Congress,' p. 199 (1866).

On this I ventured to remark that, though success had not been attained at that time in the East Indies, I did not at all despair of seeing the *Calisaya* reassume there its rightful supremacy as the queen of all quinine-growing species.

This hope has since been realized, entirely through the introduction of mixed seeds of the very best kinds of *Calisaya** to this country by Mr. C. Ledger†, an ill-requited‡ benefit, of which the Dutch plantations were fortunate enough to reap the first practical advantage.

In the 'Journal of Botany' for Nov. 1881 Dr. Trimen has published as "*Cinchona Ledgeriana*, Moens," a species of *Cinchona* which well illustrates Mr. Markham's description. The figure is taken from one of a "few adult trees of the same kind remaining in the neighbourhood," itself showing all the indications of premature decay. The tree was evidently a survival of the early plantations. Dr. Trimen says, "Trees of five or six years old have been found on several estates mingled with other varieties, and generally unrecognized until the characters were pointed out by Mr. Moens during a visit to the island in Sept. 1880."

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* In a letter, Sept. 28th, 1880, Ledger told me that Manuel collected the seed near the Rio Mamore, that the seed, at first in different bags, got mixed accidentally. "I understood him always to say the 'Rojo' has white flowers. I never saw the splendid tree in F. Simon's yard in flower. He told me, I well remember, it had white and pink flowers—both colours."

In another letter, Feb. 13th, 1880:—"I feel convinced in my own mind that no white man would or could succeed in getting such splendid seed as my faithful Manuel did. It is so clear that he got the true *Calisaya* 'rojo.' In fact, and as the good poor fellow repeatedly told me, he got seed from particularly fine old trees that we had together seen and sat under. The splendid old tree in Fr. Simon's yard we often (in 1850–51) used to look up at and wonder what age it could be. It was covered with silvery bright pink moss. We put its age at over 500 years. I have often calculated, with Manuel, that it would yield fully 15 quintals of dry bark of the three classes, viz. Tabla, Charquesillo, and Canuto."

† The seed came from Mr. M'Ivor, "obtained, there can be no doubt, from trees which originated from Mr. Ledger's seed" ('Journ. of Botany,' Nov. 1881, p. 5).

‡ "The total sum received by Ledger from the Dutch Government was a trifle less than £24 sterling" [A mistake in the English edition, the amount should read "£48." B. DAYDON JACKSON] (Van Gorkom in 'Handbook,' p. 91). Ledger, however, acknowledges (400 florins) £41 13*s.* 4*d.* and £8 6*s.* 8*d.* at that time; and on Oct. 25th, 1880, £100 was given by the Dutch Government, of the proceeds of which he gave Santiago and his family 400 sheep and 5 cows on March 7, 1881.

The whole identification, as it seems to me, rests on Mr. Moens, for whose scientific knowledge and skill as a chemist I have the highest respect. It is consequently to be regretted that no analysis or description of the bark is added. This is highly important, as I shall endeavour to show.

Sir J. D. Hooker published, in Curtis's 'Botanical Magazine,' under the head *Cinchona Calisaya*, var. *Josephiana*, "a very distinct-looking form of *Cinchona Calisaya*," which I should myself have preferred calling *C. micrantha*, var. *Calisayoides*.

The drawing is from a plant flourishing and flowering in my possession in 1872, received as a small plant from Kew, and derived originally, according to the same authority, from South America. A comparison of the plate in the 'Botanical Magazine' with those in the 'Journal of Botany' by Dr. Trimen will show a close analogy, and perhaps identity, when it is considered that mine is the *hembra* and Dr. Trimen's the *macho* form, to which circumstance the difference in the length of the flowers may be due, as also the colouring of the underside of the leaf.

Though botanically of interest, this "*Micrantha Calisayoides*" is quite evidently to be avoided in cultivation.

I am the more free to suggest the possibility of mistake in the identification of this published Ceylon variety with the specimens sent me by Mr. Moens himself from Java, and which I published as *C. Calisaya*, var. *Ledgeriana*, How., because I have myself been deceived by, as I think, the very same variety, which I received from high authority as the seed of *C. Ledgeriana*, and cultivated for years with great care, having the mortification also to have sent it out as real *Ledgeriana* to Dr. Morris in Jamaica.

Last year one of my small trees failed me (as seems to be often the case), and I have cut it down the less reluctantly, because I could then analyze the bark. Behold the result!

Quinine sulphate	0·50	
Cinchonidine	0·00	
Quinidine	0·25	1·10
Cinchonine	0·85	

the large proportion of Cinchonidine and Quinidine quite seeming to indicate its *micranthoid* analogies.

I reserved my judgment of its worth till I received from Mr. Morris a sample of the bark of the same plant grown in Jamaica.

I at once saw that it was *not* the bark of *C. Ledgeriana*, and that, on the contrary, it resembled that of *C. micrantha*. The analysis was as follows:—

Quinine sulphate	1·06	
Quinine	0·79	
Cinchonidine	0·00	
Cinchonine	0·64	0·88
Quinidine	0·24	

showing a slight improvement, which will probably increase with age; so that the produce may ultimately turn out better than the *C. javanica* of my plate viii., which gave:—

Quinine	0·50	0·70
Amorph. do.	0·20	
Cinchonidine	0·30	
Quinidine	0·20	1·40
Cinchonine	1·20	

or than my *C. Josephiana* of plate ix.:—

Quinine	0·50	0·67
Amorph. do.	0·11	
Cinchonidine	0·07	
Quinidine	0·14	0·39
Cinchonine	0·25	

It is on the whole quite evident that none of these low varieties of *Calisaya* will repay cultivation, and that no reliance can be placed on any descriptions which are unaccompanied by careful observations and analysis of the bark of the plants from which the seed is taken.

I was misled by the name *Ledgeriana* attached to the East-Indian seed which I raised; and am now sensible that the *micranthoid* aspect of the trees noticed by one or two of my Indian friends more correctly indicated their true character than the erroneous opinion which I had formed by reliance on others.

I am now able, having received from the Yarrow estate in Ceylon seed from trees whose bark yielded from 7 to 12 per cent. of quinine, to show living plants of what may safely be considered true *C. Calisaya*, var. *Ledgeriana*, specimens of which I have the pleasure of showing at this Meeting. The rich velvety appearance of the leaves is highly characteristic of the "glorious *Calisaya*" of the American forests, and contrasts strongly with the *micrantha*-looking plant, which is a descendant of the pseudo-*Ledgeriana* which I sent to Jamaica, not having then the opportunity of comparison which I now possess.

The leaves of the plant figured as *C. Ledgeriana*, Moens, are apparently glabrous, and devoid alike of the peculiar and characteristic appearance of the upper surface represented by Dr. Weddell, pl. ii. fig. 19, of his 'Histoire.' This he describes as "epidermic" cellules of the upper surface of the leaf, each one of which forms a conical projection.

A magnified hair is seen segmented ("*cloissonné*") and punctuated, taking its origin from the upper surface. This, again, is characteristic; and in the richer species of *Calisaya* which I show, this feature is even exaggerated, as will be seen on examination by the microscope; and a delicate fringe of these minute hairs forms a conspicuous surrounding to the edge of the leaf, in contrast to all the sorts of *micrantha*. The set of the veinlets in Dr. Trimen's plate is again different from that of the plant of true *Ledgeriana*, which I show.

With the exception of Mr. Ledger*, I believe that no one has obtained true seed of the more valuable sorts of *C. Calisaya* except Mr. Christy, who will, I trust, favour us with his account. Through the kindness of this gentleman, I received a small quantity of the seed in his possession, which I sowed at the same time with the *Ledgeriana* seed above. Both came up alike, and for months no difference could be perceived between the produce of the Indian and South-American seed; possibly the former were less vigorous. I raised some two or three dozen of each, with the usual results of a certain amount of variation combined with general resemblance. In the case of Mr. Christy's seed I have distinctly the *verde* and the *morada* varieties.

I can now compare all these with the plates of *Cinchona Calisaya*, var. *Ledgeriana*. These were drawn by Mr. Fitch from specimens in a herbarium containing 44 specimens of different species of *Cinchona,* of which 12 are "*Ledgeriana*" which I received from Mr. Moens in 1874, together with notes and (what is most valuable) analysis of the bark in almost every case. From these I selected specimens of *Cinchona* unquestionably derived from seed obtained by Mr. Ledger, and distinguished by the large amount of quinine contained in the bark. I have published all these analyses in pp. 58–63 of my 'Quinology of the East-Indian Plantations;' but it is necessary that I should recapitulate these.

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* "Schuhkraft, Consul for the Netherlands, more than thirty-five years in the country, married to a lady possessing estates in the Yungas, the major part of whose tenants are bark-cutters, carriers, and all knowing what bark is. With all these immense advantages he never was able to obtain seed of any value" (Ledger, Sept. 28th, 1880). Weddell, Hasskarl, and Markham equally failed.

In plate iv. (*macho* form):—

Quinine	9·06
Cinchonine	0·10
Amorph. alk.	1·40
	10·56

In plate v. (*hembra* form):—

Quinine	9·90
Amorph. alk.	2·09
	11·99

In plate vi. (neutral form):—

Quinine	9·97
Amorph. alk.	1·70
	11·67

The average produce in sulphate of quinine would certainly be more than 13 per cent. from this bark, which is also very rich and thick; and it can easily be understood that the introduction of Ledger's superior seed has been the making of the Dutch plantations. How far these forms differ in every particular from the species figured by Dr. Trimen, I have already sought to show; but there is still more to be said as to the length and form of the flowers, which I have no doubt Mr. Fitch drew (in my figures) with his usual skill*; and it is equally clear to me that the drawing in the 'Journal of Botany' has been most correct, presenting us, in fact, with a true *micrantha* flower in place of that of a *Calisaya.* Moreover, Mr. Moens gives the colour of the flowers as *light red* in his description of No. 42, from which I took the fruit-bearing branch figured under plate vi.†

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* He should have represented some of the flowers as *nutantes*; but this feature varies, as also the size of the flowers in Mr. Moens's dried specimens.

† Mr. Moens's No. 19, *C. Ledgeriana,* has also "flowers light red" (see p. 60 of my 'Quinology').

This No. 42 gave :—

Quinine....................	10·90
Amorph. alk.	1·72
	12·62

or *certainly* over 14 per cent. sulphate of quinine.

This is, then, quite the richest bark of all; and *yet the flowers are light red*, the capsules and the leaves very similar to those of Dr. Weddell's var. *microcarpa*, which I published from an engraved figure received from this gentleman. When Mr. Ledger's seeds were in this country, I was consulted by Mr. Money respecting them, and gave a favourable judgment from the appearance of the capsules *as those of the* microcarpa *variety*.

Dr. Weddell's var. *microcarpa* differs apparently from the *Ledgeriana** in the absence of scrobicules and the pubescent character of the under surface of the leaves. I have mentioned elsewhere that Dr. Weddell gave me specimens of fine *Calisaya*-barks which he obtained in his second journey, but without botanical description; these were the *verde*, the *morada*, and the *Zambita*. Nothing is more important for the botanical classification of these Cinchonæ than the examination of the barks. In this case, whilst the *verde* resembles much the *verde* of Christy, the *morada*† (as far as can be judged from such a small specimen) *may* be identical with that of the *Ledgeriana*. The plant itself (from Mr. Christy's seed) in one of its forms seems to be identical with form A of my plate vi.

It will be noticed that I have supposed the different forms A, B, and C to be relatively connected with the preponderance of the male elements in A, of the female element in B, and a sort of neutral state in C, as shown by the dissection of the flowers. Failing to observe this, Professor Flückiger has attached to a copy (reversed) of my form B both the dissection of a *macho* and of a *hembra* flower. In his fruit-bearing branch, No. 42 above, he has very properly only given the capsule and seed. On the whole, I am pleased that this very competent judge has adopted my illustrations (in so far) as "*nach Exemplaren aus Java*," and that, by implication, he admits the correctness of my descriptions.

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* See his engraved plate published in my 'Quinology.'

† Especially a specimen from Larecaja, that from Yungas rather less.

I must add a word about my form B and Dr. Flückiger's plate ii. This seems to be represented by a plant which I show to the Society, raised from seed from Mr. Gammie, Darjeeling; and it must be admitted to resemble *at first sight* specimens of the *verde* of Christy. It seems, however, that the general character of the tree and of the bark are different*. I thought that, on the whole, I was justified in describing these differing forms as one variety of *Calisaya, seeing they agree in the extraordinary richness of the bark,* but not because no other variety was to be found in the seed procured by Mr. Ledger. Of this I had proof in the plants which I myself raised from a few capsules full of seed which I took as a recompense for my trouble. There seems no limit to the multiplication of varieties unless they are somewhat grouped together. I could point out quite a number of which I know the bark, but not the botanical description†. The *Colorada anaranjada* (orange-peel red), one of these, is extensively cultivated; it is not so good as the Caupolican "rojo"‡.

These different forms of *C. Calisaya*, var. *Ledgeriana*, I now seek to illustrate by the plants before the Meeting contrasted with the *C. Ledgeriana*, Moens, to which I also call the attention of the Society.

According to Manuel, the Rojo (or true *Ledgeriana*) "is never met with in manchas (patches) like the other classes of *Cinchona*. It is found by itself here and there"§.

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* The produce per cent. of Mr. Christy's *verde* is less than that of the *morada*; but the more vigorous growth makes it more desirable for cultivation.

† One of these, which I described as *C. Forbesiana*, and from which Mr. M'Ivor took out young plants, resembles much the plant of Trimen.

‡ "I repeatedly used to joke poor Manuel when he used to tell me the trees from which the thick heavy slabs of bark, in fact the 'Rojo,' came from had white flowers. The 'Rojo' from Corioco and in South Yungas, although with purple leaves (underside), are nothing to be compared with the 'Rojo' of Caupolican and Apolobamba. This 'Rojo' or *Ledgeriana* is very little known in Bolivia even."—*Ledger*, Feb. 7, 1881.

"When the 'Rojo' trees are in flower, the leaves are 'red' underneath; when the seed is ripe and the leaves falling, they are a dark purple. Old trees in particular have on the branches a species of rough moss of a brilliant scarlet and bright silver colours."—Nov. 24th, 1875.

§ Ledger, in letter, Feb. 7, 1881.

To quote the words of M. van Gorkom (formerly Chief Inspector of Cultures in Java) in a recently published work*:—

"The *Calisaya Ledgeriana* appears then as the legitimate descendant of the noblest species of the Bolivian forest, and there occurs also in various forms, differing from each other chiefly in the shape of the leaf, but, on the other hand, agreeing in a high percentage of very pure quinine in their bark. These plants quite early distinguish themselves from the other varieties of *Calisaya*, and are regularly recognized in Java by their small white flower, which in S. America appears to be very sensitive to frost. The bark has a peculiarity quite its own. The cause why this variety does not reach Europe in large parcels appears to be that in Java very properly the trees of less value are cut down, whilst the best are reserved for later growth. On the other hand, there is fear that in British India many of the best *C. succirubra* and *C. officinalis* trees have already been felled."

In the 'Journal of Botany' for Jan. 1883 is a communication from Dr. Otto Kuntze, in which he asserts his views as to the derivation of all the species of *Cinchona* but four from hybridism†, the proof being some direct artificial production of several hybrids, and the fact that the seeds of marked trees produced plants with the mixed characters of another species. In all this controversy imagination has been too much suffered to take the place of fact. I am not aware of any carefully conducted experiments in hybridization except those of the late Mr. M'Ivor, whose lamented and early death has been a great loss to science. I received from him a carefully prepared herbarium with examples of all the sorts of *Cinchona*, including those which he regarded as hybrids; but they do not suffice to establish any theory. I have also several presumed hybrids growing in my stoves, and amongst the rest the sort which I suggested might be provisionally called *pubescens*, not regarding it, however, as a *species*, or as having the slightest affinity to the *C. pubescens*, Vahl.

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* 'A Handbook of Cinchona Culture,' 1883.

† Species of *Cinchona* grown in Java, and represented in the herbarium mentioned above (p. 321):—

C. Calisaya, Hasskarl.
„ Schuhkraft.
„ hybrid.
C. Pahudiana (How.).
C. officinalis, not *Uritusinga*, var. *angustifolia*.
C. lancifolia (? the sort), sent out by Karsten.
C. caloptera, Hasskarl.
C. micrantha (sent from Madras).
C. succirubra.
C. cordifolia (seed from Venezuela).

How is it possible that these, by *crossing*, should produce the *Ledgeriana*? which, moreover, we know to have grown from S.-American seeds, and thus added to the list.

This, however, was not *formed*, but *found* by Mr. M'Ivor. If a hybrid, it could easily be formed again. Along with this was found the sort called *magnifolia*, which is not to be distinguished (in dried specimens) from *C. Uritusinga*, but differs in size of leaf &c. when fully grown.

Incorrect statements about the "spontaneous origination" of such species as the *Ledgeriana* and the *Pata de Gallinazo* have been suffered to take the place of *facts*. A multitude of counsellors have wrought the usual results. The wrong species have been cultivated, such as the *succirubra* of the Indian plantations, which I have, as I think, proved to be inferior* both for pharmaceutical and manufacturing purposes, whilst the *Pata de Gallinazo* (whatever it may be) has been, till lately, neglected; and the offspring of the true *officinalis* (the *C. Uritusinga*) does not seem to be (normally) represented now except by a few† fine trees at Dodabetta, and, from their seed, in Jamaica. If the planters had propagated this instead of the sorts which never assume other than a shrubby aspect, the world, as well as themselves, would have been the gainer. On the top of all this mischief comes the array of theories about hybridity which throw every thing into confusion‡.

I had intended to confine my remarks to the subject of *Calisaya*; but it is not possible to isolate so completely one portion of a subject as to exclude the light reflected from other quarters. Having mentioned the *C. Uritusinga*, I will add that the improvement in this species by cultivation throws light probably upon the large produce of the *Ledgeriana.* I show the bark of this species (well ascertained by Ruiz and Pavon) as I received it from the mountains of Uritusinga, together with botanical specimens and seed which I raised, and gave therefrom a plant to the Indian Government. From the descendants of this small tree Mr. M'Ivor sent me back the bark which I exhibit, from 4 oz. of which I obtained the amount of quinine which I exhibit, 5·62 per cent., or, say, 7½ per cent. of sulph. quinine. I traced the contents of the bark by analysis from step to step, and found that though the appearance had not varied, the produce of quinine had increased in about fourfold ratio; so that a most valuable bark is the result of a somewhat unpromising beginning, the Uritusinga bark bearing (as Mr. Cross remarked to me) the aspect of having been grown in a dry or poor soil. If the *Ledgeriana* has improved as much by cultivation, it may well bear away the palm.

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* Specially in communication to the Indian Government, published in their 'Reports' (Blue books).

† Some fifty or sixty specially preserved. The plantation, from what I know of the quantity sent, must have been very freely cut.

‡ Of course I do not *deny* hybridity even in S. America; but the fact is very *local*. The owner of fresh plantations in Coroico, *apparently* of the *a vera* of Weddell, wrote thus to Ledger:—

"All our plants have been raised from seed, from trees we call 'Rojo.' The 'Rojo' here is not so good as Caupolican rojo. Ours is the Colorada anaranjada (orange-peel red). At first our trees deteriorated greatly, particularly so all round the plantations, while inside (*adentro*) they gave the best of bark."

Ledger remarks how it seems their trees "sported," no doubt owing to bees. (Oct. 14, 1880.)

In another letter he says:—"In the Yungas, when the trees are in flower, they are visited by thousands of most beautiful Humming-birds. Might not these cause 'sporting' as well as the bees?" (Dec. 10, 1879.)

Dr. Trimen, in association with Prof. Bentley, has done good service to science in descriptions of *Cinchonæ*, published in 'Medicinal Plants,' pt. 30, also in rescuing from oblivion the *C. crispa* of Tafalla. If the former able botanist will devote his attention to the (provisionally named) *Cinchona robusta*, and will give us a clear account both of the origin and probable uses of this valuable sort, giving it a clear and definite name, he will confer a lasting obligation on the cultivators of *Cinchona* in the regions of the East.

ADDENDUM.—Whilst these sheets are passing through the press, I am fortunate in receiving a visit from Mr. C. Ledger himself, on his way to Australia. I find that amongst my plants he distinctly recognizes some of those which I exhibited (from the Yarrow seed) as the true *Ledgeriana.* With equal decision he fixed on my first or A form, pl. vi., 'Quinology of the East-Indian Plantations,' as the real *rojo*, this term referring to the colour of the changing leaves *, which, he says, is *exactly represented, as well as the rich glossy appearance of the upper surface of the leaves, in my plate X.* ('Quinology of the E.-Indian Plantations,' the *Calisaya anglica*, which was drawn from a living plant and coloured under my own inspection). It resembles the change in the leaves of the *C. succirubra*, and must be very remarkable, or the term (and the terms used by these Indians are always *graphic*) would not have been employed. It is scarcely necessary to say that he entirely rejects Dr. Trimen's plate of *C. Ledgeriana*, Moens, as also my unfortunate plant of *Micrantha Calisayoides*; but it is important also to notice that he does not admit the claims of Mr. Gammie's plant, which I have described, nor of my form B, of which this is probably an example. The leaves and flowers are too large, as also are those of *C. anglica*.

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* **Not well given by Mr. Fitch.**

Briefly, the result of our meeting has been to put the whole matter before me *in a new light*, and one which, if confirmed, will furnish another and very important illustration of the benefit of cross-fertilization. It seems that Dr. Weddell had heard of these white-flowered Calisayas, but was unable to meet with them. So far from being looked upon as a distinct species, or even variety, they have been regarded as the *Tata* (father) trees by the Indians, who are intensely jealous of Europeans having any thing to do with them, as they consider that if they were destroyed, all the rest would perish and the Indians with them. When they meet with a tree of this sort, they are assured that all the surrounding Calisayas will be of good quality, and at once erect their huts and set to work. I cannot learn from Mr. Ledger any reason for this, which seems, at first sight, superstition. It must originate from observation.

Now when we consider that these same *cascarilleros* have anticipated by centuries Mr. Darwin's observations, and consequently named their trees *macho* and *hembra*, is it not likely that they may be right in this analogy also? and that the prepotent pollen of these princely fathers is necessary to keep up to its full perfection, or even to preserve from extinction, the finest race of *Cinchona*?

Now if we turn back to my first plate, and remember that Mr. Ledger recognizes this at once as the true *Tata* tree, what can we infer other than that it is (so to speak) a bull of the right breed amongst the herd.

If I am right in all these conclusions (which are my own and not Mr. Ledger's) it is of great importance that in every plantation of Calisayas the *Tata* trees should be found in sufficient numbers, and that the others should be kept free from foreign influences. Mr. T. N. Christie, of Ceylon, has recently sent, through Dr. Trimen, to the Pharmaceutical Society select specimens of his *Ledgeriana* bark as well as of *officinalis* grown by himself. Mr. Holmes, the Curator of the Museum, agreed with me in finding these so closely to resemble each other as to lead to the supposition of hybridism with *C. officinalis*. At all events, although the bark may be excellent, it would not pass current in commerce as *Ledgeriana*, nor does it resemble that sent me by Van Gorkom as such. Mr Christie, taking his trees as the standard, naturally observes that my figured *Ledgeriana* is “far from being a typical *Ledgeriana*, if, indeed, it be one at all ”*.

It is certain that the seed of form A would not *always* reproduce the form B, but also the forms B and C. The same principle must also be expected and be alike operative in other species of *Cinchona*.

Descriptions and Notes on new or rare Monocotyledonous Plants from Madagascar, with one from Angola. By HENRY N. RIDLEY, M.A., F.L.S., Assist. Botan. Depart. Brit. Nat. Hist. Mus.

[Read June 7, 1883.]

THE greater part of the plants herein described were collected by the Rev. Wm. Deans Cowan in the east and centre of the island during the past few years. Mr. Cowan's attention, among plants, was especially directed to the Orchideæ, of which, besides dried and spirit-specimens, he has brought home a good collection of coloured drawings, of no small value in a group of plants so difficult to preserve as Orchideæ. In addition to these plants, I have added notes or descriptions of interesting plants from the collections of the late J. M. Hildebrandt, and of Hilsenberg and Bojer.

All the plants, except where otherwise stated, are in the herbarium of the British Museum at South Kensington.

ENHALUS ACOROIDES, *Rich.* Nossi-bé, at 5–6 metres depth in the sea. Hildebrandt, no. 3209.

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* ‘Prize Essay on *Cinchona* Cultivation,’ by T. N. Christie, Colombo, 1883.

This Indian and Malayan plant does not seem to have been hitherto recorded from so far west as Madagascar.

LIPARIS CÆSPITOSA, *Lindl.* Imarina.—*Deans Cowan.*

OBERONIA BREVIFOLIA, *Lindl.* On trees, Ankafana.—*Deans Cowan.*

POLYSTACHYA CULTRATA, *Lindl.* Common on trees, rather low down, Ikangosoa and Ankafana.—*Deans Cowan.*

P. ROSELLATA, n. sp. Epiphyta glabra, caule basi bulbosa gracili, 4-unciali, foliis inferioribus ligulatis 2 unc. longis, $\frac{1}{4}$ latis, superioribus 2 linearibus acutis uncialibus; racemo gracili laxo paucifloro, bracteis minutis linearibus acutis, quam ovarium duplo brevioribus; floribus parvis roseis, sepalis lanceolatis acutis, petalis ovato-lanceolatis quam sepala duplo latioribus, labello obovato acuto, apice recurvo, marginibus crenulatis, columna brevissima.

A very small species, with a slender raceme of about 14 flowers. Ankafana.—*Deans Cowan.*

P. MINUTIFLORA, n. sp.—Epiphyta, radicibus pluribus longis, caule ramoso, haud bulboso, lucido, costato, foliis crebris, oblongo-lanceolatis coriaceis; paniculis terminalibus laxis, ramis pubescentibus, bracteis minutis ovatis acuminatis; floribus minimis, sepalis lanceolatis, petalis ovatis latioribus, labello decurvo lanceolato, marginibus crenulatis basi erectis.

Ankafana.—*Deans Cowan.*

This plant is remarkable for its much-branched stem, each branch terminated by a pubescent panicle of minute flowers 1 line only in length, and pinkish green in colour. Leaves 3 inches long by $\frac{1}{3}$ inch wide.

ANGRÆCUM GILPINÆ, *Rchb. f. & Moore.* Ankafana.—*Deans Cowan.* Flowers of a dull orange-red colour.

A. RECTUM, *Thouars.* Ankafana. A very powerful perfume at night; grows erect on branches, and on rocks, in the more open parts of the forest.—*Deans Cowan.*

A. RECURVUM, *Thouars.* Low down on trees or rocks. A long straggling plant; flowers early in January.—*Deans Cowan.*

A. CITRATUM, *Thouars*. Very common in the forest, Ankafana, Imarina.—*Deans Cowan*.

AERANTHUS MACROSTACHYS, *Rchb. f.* I have little doubt as to the correctness of referring to this species a drawing accompanying specimens collected by Deans Cowan on trees at Ankafana, although it differs from the figure of *Epidendrum macrostachys*, Thouars, Orch. Isles d'Afrique, fig. 83, on which this species was based, in having no cusp in the cleft of the labellum; the base of the labellum has a conspicuous green blotch; and the tip of the spur is also green.

BICORNELLA GRACILIS, *Lindl.* Imarina; in marshes at Ankafana. *Deans Cowan*. The flowers are represented as rose-pink in colour.

SATYRIUM TRINERVE, *Lindl.* Grassy plains, Ankafana.—*Deans Cowan*. Flowers white.

S. GRACILE, *Lindl.* Imarina.—*Deans Cowan*. Flowers white.

DISA BUCHENAVIANA, *Kranzl. ex descr.* Imarina.—*Deans Cowan*.

HABENARIA PURPUREA, *Thouars*. Bara, Imarina, Ivatolo in the valley to the north, April 9, 1880.—*Deans Cowan*. Imarina, "Am Rande eines Baches, Juli 1880."—*Hildebrandt*, no. 3495. I have every reason to believe in the correctness of this identification, although Thouars's figure gives no details of structure; and I have seen no authentic specimen. The colour of Thouars's figure is pink; but Deans Cowan's drawing gives it of a purple colour, very much like that of *Orchis mascula*.

CYNOSORCHIS UNIFLORA, *Lindl.* Near water in open country, Ankafana.—*Deans Cowan*. The single specimen collected by Lyall, on which Lindley founded the description of this species, has but one flower, as its name denotes; but in all the other specimens which I have seen there have been more, from 2 to 4. The flowers are the largest in the genus, except those of *C. grandiflora*. The sepals and petals are dark green, the labellum dull pinkish red with a purple blotch at the base.

C. GIBBOSA, n. sp. Herba terrestris sesquipedalis, tuberibus lanatis, foliis radicalibus 1–2 ovatis lanceolatis, scapo erecto hispido, foliis caulinis duobus distantibus lanceolatis acuminatis;

racemo multifloro; floribus in apice scapi aggregatis, bracteis lanceolatis acuminatis hirtis, quam ovarium duplo brevioribus, sepalo superne lanceolato basi gibboso apice excurvo, lateralibus inæquilateralibus oblongis obtusis curvis, petalis angustioribus, labello semiunciali trilobo basi angusto longo, lobis lateralibus angustis linearibus obtusis incurvis, lobo medio spathulato emarginato, calcari longo gracili curvo clavato processibus stigmaticis longis linearibus oblongis, caudiculis polliniorum capilliformibus 13 millim. longis, ovario unciali recto gracili hispido; capsula fusiformi.

Imarina, Ankafana.—*Deans Cowan.* Vahi-taki-fotsa incolarum.

This plant is remarkable for the shape of the posterior sepal, which is gibbous at the base, the dilated portion projecting behind the column. The lateral sepals are inæquilateral; and all are upcurved at the apex, suggesting somewhat the shape of the the petals of some leguminous plant. The spur is long and slender, dilated towards the extremity, and then tapering again to a point. The flowers are rather large and more numerous than usual in this genus.

C. GRANDIFLORA, n. sp. Herba terrestris, tuberibus oblongis lanatis, foliis vaginantibus, radicali lanceolato patente triunciali, caulinis scapum vaginantibus erectis, scapo 4-unciali 1–2 flores magnos ferente, sepalis oblongo-lanceolatis viridibus rufo-maculatis, petalis angustioribus albis, labello lato quadrilobato, lobis lateralibus obovatis, medio in duos lobos late divergentes fisso, calcari longo apice subito dilatato, columna brevissima, processibus stigmaticis gracilibus curvis.

Var. *α.* purpurea, labello purpureo basi maculata, inodora.

Var. *β.* albata, labello albo basi purpurea, odorata.

Common on damp rocks, Ankafana.—*Deans Cowan.*

This plant is distinguished by the one or two conspicuous flowers, much larger than any of the others in the genus. The tubers are 1½ inch long; the leaves are all appressed to the stem, but one radical one, which is recurved; they are dark green with brown spots. The flower varies in colour considerably; apparently the commoner form has green sepals with dark red spots and white petals; the lip is purple with darker spots at the base, and 2 inches long by 1 in diameter. In the other form the lip is white with a purple blotch at the base and a few pink spots

on the underside at the tip. The pollinia are green, and have the long slender pedicels, and the pink anthers the corresponding long arms characteristic of the genus. The spur appears to be usually concealed in the uppermost sheathing leaves; it is long and straight, and the terminal half is suddenly dilated.

DIOSCOREA HEXAGONA, *Baker*.

To this species I have, after much doubt, referred a number of plants collected by Hilsenberg and Bojer and Hildebrandt. They are erect unbranched plants about a foot high, with narrow 5-nerved leaves. The sexes are on distinct plants; the male plants have lax few-flowered suberect racemes, and are in structure similar to those of the type. The female plants have erect lax racemes with few shortly pedicellate flowers, and acuminate bracts as long as the pedicels. The lobes of the perianth are six, small, obtusely ovate; and each bears a short rudimentary stamen. There are three distinct styles, short and thick, with bifid curved stigmas. The fruit is oblong, 3-winged, erect, and crowned with the persistent remains of the perianth. Among the type specimens in the Kew Herbarium one is a climbing form; and in this specimen the leaves are cordate; in the others, which seem to have been erect-growing, the leaves are narrower and more similar to those of the above-described plants. It is probable that the young plants are erect, and bear narrow leaves, and later in life take on a climbing habit and leaves of a shape more characteristic of the family. Several, indeed, of the smaller species of *Dioscorea*, such as *D. pyrenaica* and *D. pusilla*, appear to have a somewhat erect habit in their younger stages, though they never appear to grow for more than an inch or two erect.

Hilsenberg's specimens were gathered "in graminosis montium prov. Emerinæ," where it was called by the natives *kitaootaoo*. Hildebrandt's are labelled "Feuchten Stellen, Nord-Betsileo land, Jan. 1881 (no. 3876)."

XEROPHYTA SPINULOSA, n. sp. Frutex ramosus, ramis basibus foliorum vetustorum tectis, foliis linearibus acutis basi vix dilatata, 6–12 rosulatis, semipedalibus, marginibus spinis crebris armatis, scapis unifloris, quam folia vix longioribus, gracilibus viscosis, phyllis perianthii uncialibus glandulosis linearibus oblongis, staminibus ligulatis, ovario conico glanduloso.

This plant is closely allied to *X. dasylirioides*, Bak., but is distinguished by the linear acute leaves hardly dilated at the base and gradually tapering to the point, covered densely with a pubescence, especially on the back, the edges also being furnished with numerous slender spines. The bases of the old leaves which clothe the branches are deeply grooved and recurved at the tip. The pedicel of the flower is slenderer, and the flower itself smaller than that of *X. dasylirioides*. The ovary is $\frac{1}{4}$ inch long and very viscid. It was collected at Ankafana by Deans Cowan, who also obtained *X. dasylirioides*, Bak., and *X. pinifolia*, Willd., which does not seem to have been collected since the time of Commerson, three of whose specimens are in the herbarium of the British Museum.

Drimia Cowanii, n. sp.; bulbo ovoideo magno, foliis duobus synanthiis linearibus acutis flaccidis, scapo erecto crassiusculo bipedali et ultra tereti rufescente, racemo laxiusculo, floribus triginta, pedicellis brevibus suberectis, bracteis linearibus acuminatis basi dilatatis, quam pedicelli longioribus, perianthio tubuloso segmentis ligulatis acuminatis subæqualibus quam tubus duplo longioribus, staminibus uniseriatis, filamentis complanatis, antheris oblongis versatilibus, ovario ovato trigono, stylo filiformi, stigmate capitato, capsula ovata alata reticulata brunnea, seminibus pluribus discoideis atris.

No plant of this African genus has hitherto been recorded from Madagascar. This species belongs to the section in which the leaves appear just as the flowers are beginning to wither. The bulb is, in the pressed plant, 2 inches in diameter, and covered with the purplish tunics. The leaves are 9 inches long and $1\frac{1}{4}$ inch broad; the pedicels of the flowers lengthen in the fruiting state to $\frac{3}{4}$ inch. The perianth is $\frac{3}{4}$ inch long, reddish in the dry plant; the segments twice as long as the tube, and terminated by a short point. The capsule is shorter than the persistent perianth, about $\frac{1}{2}$ inch long. It is called "*tongolovoalava*," Rat-onion, by the natives, who use it for poisoning rats. It was collected by Deans Cowan close to Fiarantsoa, Betsileoland, growing on a rock with damp soil.

Kyllinga elatior, *Kunth*. This South-African plant has been obtained at Ankafana by Deans Cowan; it is called by the natives *Kirindrala*.

Courtoisia cyperoides, *Nees*. Imarina.—*Hildebrandt*, 3795. Hitherto, as far as I am aware, only recorded from the Indian peninsula.

SCIRPUS FLUITANS, *L.* Ankafana.—*Deans Cowan.*

This cosmopolitan plant does not seem to have been previously recorded from Madagascar. It is of the typical form.

S. CORYMBOSUS, *Heyne*, var. MINOR, *Bœckler.* (S. brachyceras, *Hochst.*). Imarina (*Hildebrandt*, 3789). Andrangaloaka, East Imarina (*Hildebrandt*, 3733).

FIMBRISTYLIS SCHŒNOIDES, var. CILIATA, n. var.

This variety differs from the typical form in its shorter leaves, with the testaceous vaginæ ciliated at the mouth with white hairs. The glumes are brown and velvety with ciliate margins; the tip also of the involucre is hispid. The stamens have long white flattened filaments, and oblong apiculate chocolate-brown anthers. In one flower the style was bifid, but usually, as in the type, they were trifid. The specimens were collected by Hilsenberg and Bojer in Madagascar without specific locality. The typical form is African.

F. CINEREA, n. sp.; rhizomate breviter repente, radicibus tenacibus, culmis debilibus setaceis subpedalibus teretiusculis apice triquetris, dense seriatis basi bulbosis, vaginis vetustis castaneis tectis, foliis setaceis copiosis, quam culmus parum brevioribus et pubescentia cinerea tectis, vaginis castaneo-brunneis glabris striatis brevilaminiferis, umbella parva pauciradiata, spiculis lanceolatis acutis 4–5-pedicellatis una sessili, foliis involucralibus 2 glumaceis parvis, squamis lanceolatis atro-sanguineis trinerviis carinatis lucidis, marginibus minute ciliatis, staminibus tribus, filamentis brevibus, antheris rubris, stylo profunde trifido, caryopsi obovata trigona alba transversim rugosa, tuberculo parvo. "Auf trocknen Hügeln, Sirabé, N. Betsileo, Madagascar, Aug. 1830."—*J. M. Hildebrandt*, 3597.

This plant belongs to the *Oncostylis* section of ***Fimbristylis***, and has some affinity with *F. capillaris.* It is remarkable for the dense ash-coloured wool covering the leaves and culms to near the top, giving the plant the appearance of being attacked by a mildew.

RHYNCHOSPORA LEUCOCARPA, n. sp. Planta tripedalis, glabra, culmo foliato striato scabrido, foliis plurimis linearibus acutis scabris striatis quam culmus brevioribus, $1\frac{1}{2}$ lineam latis, panicula composita laxa, ramis brevibus compressis, vaginis foliatis breviter fissis, spiculis pedicellatis bilinealibus deflexis squamis ovatis

purpureis vel viridibus purpureo-maculatis 5–6, inferioribus 2–3 vacuis, una mascula, staminibus tribus rufis, setis complanatis hispidis 6, terminali fertili; staminibus 3, setis 6, stylo trifido persistente; caryopsi pyriformi rostrata subglobosa, tricostata, alba viridi tincta. Imarina.—*Deans Cowan*; *Baron*, 339.

A tall coarse plant with something of the habit of a *Scleria*.

ACRIULUS, n. gen.

Herbæ perennes, validæ, scabræ, foliis latis coriaceis viridibus, panicula terminali laxa. Spiculæ parvæ, unisexuales, dissitæ, floribus 3–4, terminalibus, glumis vacuis 3–4. Setæ nullæ. Stamina tria. Antheræ apiculatæ, apiculo noduloso. Stylus profunde trifidus, articulatus, basi dilatatus. Caryopsis globosa.

A. GRIEGIFOLIUS; radicibus crassiusculis, foliis viridibus, coriaceis ensiformibus pedalibus ½ uncia latis quam culmus brevioribus striatis et costis duabus distinctis munitis, marginibus spinis armatis, culmis 2 foliatis triquetris marginibus scabris, panicula pedali, ramis elongatis gracilibus triquetris scabris, bracteis lineari-lanceolatis scariosis, spiculis masculis dissitis fere sessilibus 5–8-floris, squamis lanceolatis acutis, apice longe hyalinis, basi purpureis vel purpureo-maculatis, inferioribus 2 vel 3 vacuis, superioribus 4 masculis, staminibus tribus flavis apiculatis, apiculo rubro noduloso. Spiculæ femineæ desunt. Angola, in paludibus alte herbidis ad flumen Cacolobar pone lacum Ivanta-la, in Huilla, ut videtur rarius: unicum specimen biculme legi ad finem Feb. 1860.—*F. Welwitsch.*

A. MADAGASCARIENSIS; rhizomate descendente vel breviter repente crasso vaginis vetustis dense tecto, vaginis brunneis lucidis chartaceis striatis integris, culmis 2–3-pedalibus foliatis triquetris striatis, foliis linearibus acutis carinatis marginibus carinisque ciliatis; panicula densa erecta, ramis gracilibus rufo-brunneis triquetris pubescentibus; spiculis sessilibus pluribus bracteatis, bracteis lanceolatis acutis marginibus carinisque ciliatis, viridescentibus purpureo-maculatis; *masculis*, squamis 4 inferioribus vacuis, squamis 3 ♂, staminibus 3, filamentis brevibus, antheris carneis apiculatis; *fœmineis* perpaucis, squamis majoribus tribus vacuis unoque pistillum involvente, stylo trifido profundissime fisso, basi dilatata rufescente; caryopsi globulosa alba lucida.

"Vendrana," boggy ground, Ambatolampy, Oct. 1882, *Baron*, 1870. Andrangaloaka, East Imarina, *Hildebrandt*, 3751.

These are coarse marsh-plants, with rather broad stiff leaves ciliated at the edges and carinæ, erect rather close panicles of small green and purple or entirely purple spikelets, of which far the greater number are male. Indeed, in the African species I have been unable to find any female flowers. The female spikelets in *A. madagascariensis* are situated at the base of the lower branches of the panicle, generally between two of them; they have fewer and larger glumes than the male spikelets. The three lower glumes are empty; the fourth closely enwraps the pistil. The style is very deeply trifid, and its base is dilated and articulated to the ovary; so that when the fruit is ripe, the style entirely drops off at the articulation, leaving the white rounded nut; below the nut is a small inconspicuous disk. The male spikelets are very numerous; they have from 2 to 4 empty glumes at the base, and 3 or 4 terminal flowers, each composed of 3 stamens and a single glume. The stamens are remarkable for the possession of a short conical apiculus, crimson in the African species, covered with short nodular processes. Similar, but less developed, outgrowths occur in some species of *Cryptangium*. They seem to be rudimentary trichomes, and from their form and position suggest some homology with stigmatic hairs.

The genus is most nearly allied to *Scleria*, though at first sight very dissimilar. The habit, solitary spikelets, and deeply cleft style not continuous with the ovary are sufficient to distinguish it. The ovary in *A. madagascariensis* was in several instances destroyed by a fungus resembling ergot.

FINTELMANNIA SETIFERA, n. sp.; rhizomate breviter repente, vaginis vetustis dense tecto, culmis pluribus teretiusculis gracilibus striatis foliatis, foliis setaceis acutis striatis culmos subæquantibus, setis albis appressis ciliatis, vaginis fissis, panicula laxa, spicis parvis pedunculatis, pedunculis obscure triquetris basi ciliatis, bracteis ovatis acuminatis, acumine apice ciliato, spiculis pluribus aggregatis, spicis superioribus masculis, inferioribus paucis bisexualibus, bracteola ovata acuminata ecarinata rufescente, squamis duabus ovatis lanceolatis scariosis, staminibus tribus, filamentis elongatis complanatis rufescentibus, antheris apiculatis, stylo trifido longiusculo complanato, setis hypogynis nullis. Caryopsis deest. Madagascar (*Deans Cowan, Hilsenberg and Bojer*).

The only other species in this genus is *F. restioides*, a Brazilian plant, which differs from the Madagascar plant in the setaceous leaves armed with bristles, the creeping rhizome, and several other points. The whole plant is 15 inches high, with numerous leaves and culms; the female flowers very few in number, only 2 or 3 in the upper part of the lower spikes.

On the Selagineæ described by Linnæus, Bergius, Linnæus, fil., and Thunberg. By R. A. Rolfe, Herbarium, Royal Gardens, Kew. (Communicated by Prof. Oliver, F.L.S.)

[Read June 2, 1883.]

For several months I have made a careful study of this interesting but neglected order with a view of monographing it. At the outset it became apparent that many of the species of these early authors have been hitherto entirely misunderstood, a circumstance arising from several causes—primarily from the absence of authentic specimens, and the difficulty of determining the species from the short and imperfect descriptions supplied, descriptions not always based on the best characters, some of which require dissection for their adequate definition, but on those superficial characters which often equally apply to more than one species, and, secondly, from the fact that some species are excessively local, a circumstance which in several instances led to an old name being applied when a new one should have been given. Thus *Hebenstreitia dentata*, L., and *Selago fruticosa*, L., were unknown to Thunberg, though he applied the names to very different plants. It therefore appeared to me that the species of these early authors could best be dealt with in a separate paper, which I now venture to offer to the Society in the hope that in some measure it may remove these misconceptions.

The arrangement I have adopted is a chronological one, which seems to me the best applicable to the case; and under each species is given, first, the condition of the original specimens in the respective herbaria, and, secondly, a note as to what has been done with each by later authors. Where the species was founded on an old figure, I have considered this as the type, provided always that the description agrees with the figure; and where founded on an old description, the same course has been adopted; although, where practicable, the original specimen has been consulted, as in the case of Plukenet's plants. The sign ! indicates that I have seen an authentic specimen. The references to later authors are generally E. Meyer and Choisy, the former of whom described Drège's plants, publishing forty-four new species, of which authentic specimens of thirty-three exist in the Kew Herbarium. Choisy twice monographed the order, first, in 1823, in the 'Mémoires de la Société de Physique et d'Histoire Naturelle de Genève,' and later, in 1848, in the twelfth volume of De Candolle's 'Prodromus.' By "Choisy" this latter monograph is always intended (unless specified to the contrary) as the latest revision of the order. Names intended to be kept up (the oldest unappropriated name under each genus) are printed in small capitals; synonyms, or species mentioned incidentally, in italics.

The genus *Globularia*, a separate order in De Candolle's 'Prodromus,' but much better included in Selagineæ, is included here for the sake of completeness and because one of the species of Linnæus, to this day undetermined in books, I have been able to identify with *G. vulgaris*, L., by consulting Plukenet's type on which it was founded.

To the following gentlemen I offer my best thanks for material assistance in various ways, without which it would have been impossible to unravel the intricate synonymy and to present this paper in its present form :—to W. Carruthers, F.R.S., of the British Museum, for the opportunity of consulting some of the types on which the Linnean species were based, as those of Plukenet, Linnæus's 'Hortus Cliffortianus,' &c.; to Dr. Murie, for the opportunity of consulting the herbarium of Linnæus; to Prof. Warming, of Stockholm, for the loan of the Selagineæ of the herbarium of Bergius; to Prof. Elias Fries, of Upsala, for the loan of the Selagineæ of the herbarium of Thunberg, containing, with one exception, the types of the younger Linnæus also (this latter I have found in the Linnæan Herbarium); to Prof. Eichler for the loan of the Selagineæ of the herbarium of the Royal Botanic Gardens at Berlin, containing a large number of Choisy's types, as it was worked up by him for his last monograph in De Candolle's 'Prodromus;' also the types of Link and Jarosz; and, finally, to Sir J. D. Hooker, K.C.S.I., and to Prof. Oliver, F.R.S., for their services in obtaining for me the abovementioned herbaria; also to the same gentlemen and to Mr. N. E. Brown, for their opinions on a few difficult points in nomenclature.

The following brief outline will give some idea of the scope of the present paper, with a reference to the latest revision, namely that in De Candolle's 'Prodromus,' vol. xii., to show the alterations which I propose.

A. *Species described by Linnæus prior to Bergius.*

Of the seven species of *Globularia*, six are unchanged at the present time, and the seventh is identical with one of these. Of eight species of *Selago*, four belong to the genus, a fifth is a species of *Agathelpis*, while three are excluded from the order, viz. a *Lyperia*, a *Manulea*, and a *Stilbe*. The two species of *Hebenstreitia* described are both kept up. My only alteration is the reduction of the four species of *Selago* to two, the reinstation of the second species of *Hebenstreita* to specific rank, and the determination of one species of *Globularia*.

B. *Species described by Bergius.*

Of five additional species described by Bergius, all belong to the Order; one, called *Eranthemum*, belongs to *Agathelpis*, one, *Hebenstreitia*, to *Dischisma*; and of the three species of *Selago*, two are correct, the third being a species of *Microdon*. His three Linnæan plants are correctly determined; but one is the aforementioned species of *Stilbe*.

C. *Species described by Linnæus, after Bergius.*

Of four new species of *Selago* described by Linnæus, one is a *Stilbe*, and three belong to the genus, though one is a plant of Bergius under a new name; a species referred to *Lippia* belongs to *Microdon*; one of *Hebenstreitia* is correct; and two referred to *Eranthemum* belong to *Agathelpis*; but one of them is the plant of Bergius under a changed name, which Linnæus had not seen; and both probably represent the same species. Of the species of Bergius enumerated by Linnæus, one is wrongly determined in the herbarium of the latter, while the true plant, though present, is entirely overlooked.

D. *Species described by the younger Linnæus.*

A new species referred to *Bartsia* belongs to this Order, and is made up of two species of *Lagotis*; eleven of *Selago* represent ten species of this genus and one of *Microdon*; and the two of *Hebenstreitia* represent the same number of *Dischisma*.

E. *Species described by Murray.*

A species referred to *Eranthemum* is merely a changed Linnæan name, and belongs to *Agathelpis.*

F. *Species described by Thunberg.*

Of thirteen additional species of *Selago*, two do not belong to the Order, viz. one *Phyllopodium* and one *Vandellia*; and three more are now excluded from the genus, namely two of *Microdon* and one *Agathelpis*; the latter, however, is a species of Linnæus under a new name; and one of the former is a species of Bergius's, also under a new name. One *Selago* is a form of an old one; and the remaining seven are new. Of three species of *Hebenstreitia*, two now belong to *Dischisma*; the third belongs to the genus, but is a Linnæan species under a new name. One old name, quoted by Thunberg under *Selago*, represents two species, but neither of them the plant of Linnæus; so that I have been compelled to describe them as new. A third species is also described from one of Thunberg's sheets which does not correspond with two others agreeing with the description, which latter are therefore considered as the types. One species of *Hebenstreitia* is wrongly referred to a Linnæan name; and in this case also two species are represented on the sheets.

Species originally published in Linnæus's 'Species Plantarum,' ed. i. (1753).

P. 95. GLOBULARIA ALYPUM, *L.*! Two specimens on one sheet. Founded on *Alypum monspelianum sive frutex terribilis*, J. Bauh. Hist. i. p. 598, &c., and correctly understood by authors.

P. 96. *G. bisnagarica, L.*! There is no trace of this in the Linnæan Herbarium. It is founded on *Scabiosa bisnagarica sive Globularia frutescens* etc., Pluk. Almagest. p. 336, t. 58. fig. 5, which no one appears to have yet determined. A. De Candolle (Prod. xii. p. 614) classes it as "Species verisimiliter delenda." I have consulted Plukenet's type, now in the British Museum, and find it is nothing but GLOBULARIA VULGARIS, L., under which the former name will sink as a synonym. "Bisnagur is an ancient kingdom of Hindostan, and comprehended almost all the countries in the peninsula south of the 16th parallel" (Rees's 'Cyclop.' vol. iv.). So that the locality given by

Linnæus, "Hab. in Bisnagariæ sylvis," must be a mistake, as the plant is not known from India.

G. VULGARIS, *L.*! Two specimens on one sheet. Founded on *Globularia caule herbaceo*, &c., L., Fl. Suec. 109, &c., and correctly understood by authors.

G. SPINOSA, *L.* No specimen. Founded on *Globularia spinosa*, Tournef. Institut. p. 467, and correctly understood.

G. CORDIFOLIA, *L.*! One specimen. Founded on *Globularia foliis radicalibus*, &c., L. Hort. Cliff. p. 491, and correctly understood.

P. 97. G. NUDICAULIS, *L.* No specimen. Founded on *Globularia pyrenaica*, &c., Tournef. Institut. p. 467, and correctly understood. In the Linnæan Herbarium is a sheet labelled by Linnæus "*G. nudicaulis*," on which Sir James Smith has written in pencil "vulgaris?". It is a specimen of *G. vulgaris*, L., and proves that Linnæus misunderstood Tournefort's plant on which he founded the species.

G. ORIENTALIS, *L.*! One specimen. Founded on *Globularia orientalis floribus per caulem sparsis*, Tournef. Institut. Corollar. p. 35, and correctly understood.

P. 629. SELAGO CORYMBOSA, *L.*! One specimen. Founded on Commelyn, Hort. Amstel. ii. p. 79, t. 40, &c., and correctly understood, excepting that Meyer wrongly reduces to this as a synonym *S. polystachya*, L. Mant. p. 250, an error repeated by Choisy; while Meyer had the true *S. polystachya* as "*S. cinerea*, Thunb.," which Choisy also followed. On the right-hand side of the above sheet is a small specimen with ticket "No. 8, Phylica? et quænam (?);" and on it Linnæus has written "S. corymbosa e Natali;" but it is *S. stricta*, Berg.!, though I have not seen a specimen from Natal, which locality can scarcely be correct.

S. SPURIA, *L.*! One specimen. Founded on Burm. Afric. p. 115, t. 42. fig. 3, and correctly understood. But it must also include *S. rapunculoides*, L. Amœn. Acad. iv. p. 319, and *S. coccinea*, L. Amœn. Acad. vi. p. 89, two species kept up with difficulty by Meyer and Choisy, but which absolutely break down in the long series of specimens I have examined. *S. rapunculoides*, L., is a very vigorous form from old woody plants with large irregular corollas, while *S. spuria*, L., represents a weaker state from younger plants with smaller and more regular corollas; both the preceding have usually white or pale lilac corollas; but Burchell says of one specimen, "Flores purpurei." Of *S. coccinea*, L., I have not seen an authentic specimen, though, as he says, "Simillima *Selag. rapunculoidi*," and "Flores saturatissime purpurei," there is not the slightest doubt what the plant is, and that Meyer's specimen! represents the true plant of Linnæus. Thus the flowers of *S. spuria*, L., vary between white and purple, and the forms cannot be kept up as varieties. *S. heterophylla*, Thunb.! is a very young seedling of the same species, with the large basal leaves which are only present in young specimens.

S. dubia, L.! One specimen. Founded on Burm. Afric. p. 130, t. 47. fig. 3, and Pluk. Mant. p. 180, t. 445. fig. 6! and correctly understood. It is *Eranthemum angustifolium*, Murr.! and AGATHELPIS ANGUSTIFOLIA, *Choisy*!

HEBENSTREITIA DENTATA, *L.*! In the Linnæan Herbarium are three sheets pinned together; sheet 1 contains one specimen, and sheet 2 one specimen on the left-hand side, of the true plant. Both are correctly labelled by Linnæus. On the right hand of this second sheet is a small specimen of *H. ciliata*, Berg.!, which Linnæus failed to distinguish. Sheet 3 contains two branches from the inflorescence of *Selago spuria*, L.; but there is no name attached. The species was founded on Commelyn, Hort. Amst. ii. p. 217, t. 109, and Burm. Afr. p. 114, t. 42. fig. 2, and is correctly understood by authors.

H. INTEGRIFOLIA, *L.* No specimen. It was founded on *H. foliis integerrimis*, L. Hort. Cliff. p. 497, &c. Linnæus points out that it differs from his other species, which has "Foliis alternis, acuminatis, aliquot minimis denticulis notatis; flores alternos, bracteis subulatis," by its "Folia fert linearia, obtusiora, nunc opposita, nunc stellata, foliolis multis ex alis, integerrima. Florum spicæ laxæ; floribus oppositis, bracteis ovatis." This constitutes our sole knowledge of the species, as there is no specimen preserved from Cliffort's garden in the British Museum, but only one of *H. dentata*, L. But the above differences point distinctly to the plant afterwards described by Thunberg (Prodr. Pl. Cap. p. 103) as *H. scabra*!, and later by Andrews (Bot.

Reposit. t. 252) as *H. aurea.* Of the latter only the figure is known; but E. Meyer's specimen (Comm. p. 248) under this name which I have seen is identical, and is also the plant of Choisy. I therefore propose to retain H. INTEGRIFOLIA, *L.*, for this species. Linnæus afterwards (Mant. p. 420) would seem to have forgotten the species, as he enumerates it after *H. dentata* and *H. ciliata* (in the order named) with the remark "videtur mera varietas ciliata, utraque *H. dentatæ* valde affinis;" but there is nothing ciliate about his original *H. integrifolia*, and the plant here mentioned was probably an entire-leafed form of *H. ciliata.* Murray (Syst. Veg. p. 570), enumerating it after *H. dentata*, says: "Nimis præcedenti affinis," which was doubtless only a reecho of what Linnæus had said. Thunberg first sinks *H. integrifolia*, L., as a synonym of *H. dentata*, L.; but Thunberg's *H. dentata*! is very different (*vide infra*, p. 354). E. Meyer and Choisy follow Thunberg in this view, but with the difference that they both know the true *H. dentata*, L.

Species originally published in Linnæus's 'Amœnitates Academicæ,' vol. iv. (1759).

P. 319. *Selago rapunculoides*, L.! Two sheets. Sheet 1 contains one correct specimen, and sheet 2 one specimen on the left-hand side. On the right hand is a specimen which Sir James Smith has marked off, and added "*Manulea*" in pencil. The species was founded on Burm. Afric. p. 115, t. 42. fig. 1, and correctly understood in the main, though Choisy refers some of the vigorous specimens which this figure represents to *S. coccinea*, L. It is only a vigorous form of S. SPURIA, *L.*! from old woody plants.

Species originally published in Linnæus's 'Systema Naturæ,' ed. 10 (1759).

P. 1117. *Selago prunastri*, L.! Two specimens on one sheet. Afterwards corrected to STILBE PINASTRA, *L. Mant.* p. 305.

Species originally published in Linnæus's 'Amœnitates Academicæ,' vol. vi. (1763).

P. 89. *Selago coccinea*, L. No specimen. But, as he says 'Simillima *Selag. rapunculoidi*, sed folia crassiora" &c., "Flores, saturatissime purpurei," it is clear that Meyer's *S. coccinea*! is the same plant. Choisy includes under the name some of the vigorous forms which belong to *S. rapunculoides*, L. The whole belong to S. SPURIA, *L.*, and cannot be kept up, even as varieties.

P. 90. *S. tomentosa*, L.! Six specimens on four sheets. Afterwards corrected to MANULEA TOMENTOSA, *Murr. Syst. Veg.* p. 569.

Species originally published in Linnæus's 'Species Plantarum,' ed. 2 (1763).

P. 877. *Selago lychnidea*, L. No specimen. Afterwards changed to *Erinus lychnideus*, Thunb. Fl. Cap. p. 474, which latter is referred, with a "?," to *Lyperia fragrans*, Benth.! in DC. Prodr. x. p. 358; "but Bentham quotes Burm. Afr. p. 138, t. 49. fig. 4 (*bona*)," which is the identical figure on which Linnæus founded his plant; so that the Linnæan name must fall under LYPERIA FRAGRANS, *Benth.*!, whether the plant of Thunberg represents the same species or not.

Species originally published in Bergius's 'Plantæ Capenses' (1767).

In this work the following are enumerated:—A new species of *Eranthemum*, still remaining doubtful; two species of *Hebenstreitia*, one of which is new; and five of *Selago*, three of which are new. Of these eight species, I have seen four in the herbarium of Bergius; the others are believed to be lost; but from the careful and lengthy descriptions, there is little difficulty in determining them.

P. 2. *Eranthemum parviflorum*, Berg. Not seen. This species is founded on Commelyn, Hort. Amstel. ii. p. 119, t. 60, and *Thymelæa Africana foliis Lini, floribus in capitulum congestis*, Herm. Catal. Pl. Afric. p. 33 (in Appendix to Burm. Thes. Zeylan.), and may not have existed in the herbarium of Bergius at all. But his description says "Cal. quinquefidum" and "Stam. 2;" while Commelyn says "stamina quatuor" and "perianthio bipartito;" the latter character in the drawing represents *Hebenstreitia*; but the "corolla in quinque lacinos divisis" (*sic*) is quite wrong. Unless the type exists, I fear it must remain a puzzle; but it cannot be considered the type of Bergius unless it can be proved that he saw the specimen, and that Commelyn's description was made from the bad figure. Respecting Hermann's plant, there are no more particulars than the eight words above quoted. If it is the same as Bergius's description, there is nothing essentially different from *Agathelpis angustifolia*, Choisy !, called at that time *Selago dubia*, L., a plant not enumerated by Bergius. Can Hermann's type be found? Linnæus (Mant. Pl. p. 171) changed the name to *Eranthemum parvifolium*. Lamarck (Encycl. Méth. ii. p. 384; Ill. i. t. 17. fig. 2) appears to copy exactly a branch from Commelyn (without representing the anthers) and the description from Bergius. Choisy, in founding the genus *Agathelpis*, primarily on *Eranthemum angustifolium*, Murr., misquoted "L.," bases a second species on the above figures and descriptions, which he calls *A. parvifolia*; and to show that he had not seen a specimen, he quotes "Lam. Berg." In his later monograph he enumerates the species, but says "excl. syn. Comm.," while he quotes that of Lamarck, which seems to be a copy of a small branch from Commelyn, without stamens and dissections. Thus the species rests entirely on the description of Bergius (as the figures must be excluded), and this agrees very well with *A. angustifolia*, Choisy, and, I believe, applies to it; but a glance at this original specimen would make it quite certain either way. Choisy (DC. Prodr. xii. p. 23) says of *A. parvifolia*, "Omni parte minor, corollæ tubo recto a præcedente distinguitur;" but if this were not borrowed from a figure, there are small rigid specimens with straight tubes which belong to *A. angustifolia*.

P. 154. *Hebenstreitia ciliata*, Berg.! One specimen, received from Thunberg. It is founded on Burm. Afr. p. 109, t. 41. fig. 1, and is DISCHISMA CILIATUM, *Choisy*. Linnæus mistook the plant in his herbarium, though his book-name (Mant. p. 420) is only an enumeration of Bergius; but Thunberg, Choisy, and Meyer rightly understood the species. Lamarck (Encycl. Méth. iii. p. 78) changed the name to *H. hispida*, but quoted Bergius and the old figure on which the plant was founded. This Choisy (DC. Prodr. xii. p. 7) called *Dischisma hispidum* !, and distinguished it from his original *D. ciliatum* (Mem. Selag. p. 24) by its greater hairiness. It is, however, nothing but a well-developed form of the latter, and not even a variety.

P. 155. SELAGO STRICTA, *Berg.*! One specimen. Thunberg correctly understood it; but not so Meyer and Choisy. It is that part of *S. tephrodes*, E. Mey.! from locality "*c*"!; the latter species based on three distinct plants. It is also *S. hispida*, Choisy! non L. fil.! Choisy's *S. stricta*! is not the plant of Bergius, but it is that part of *S. tephrodes*, E. Mey., from locality "*a*"! for which Meyer's name may be retained.

P. 157. *S. capitata*, Berg. Not seen; but I have no doubt Thunberg correctly referred it to his own *S. ovata, Lippia ovata*, L. It is MICRODON OVATUS, *Choisy*!

P. 159. S. SERRATA, *Berg.* Not seen; but the ample description leaves no doubt that it is the plant afterwards described by Linnæus (Mant. p. 250) as *S. fasciculata*!, a name used by subsequent authors. Choisy sinks *S. serrata*, Berg., as a synonym; but as it is four years prior to the Linnæan name, it must take precedence. Of the other species enumerated by Bergius, the two following are in his herbarium:—

HEBENSTREITIA DENTATA, *L.*! *Sp. Pl.* ed. i. p. 629. One specimen, correct.

SELAGO CORYMBOSA, *L.*! *Sp. Pl.* ed. i. p. 629. One specimen, correct.

Species originally published in Linnæus's 'Mantissa Plantarum,' part i. pp. 1–142 (1767).

P. 87. *Selago ericoides*, L. One specimen. Afterwards corrected to STILBE ERICOIDES, *L. Mant.* p. 305.

SELAGO FRUTICOSA, *L.* One specimen with an urn at the base. Thunberg misunderstood the species, and no one has since put it right. Choisy called it *S. recurva*, E. Mey.; but it is not Meyer's plant of that name. Thunberg's *S. fruticosa* represents two species (*vide infra*, p. 355). Meyer's I have not seen, but it is not the true plant; and Choisy's is again different. A second sheet labelled by Linnæus "*S. fruticosa*," but afterwards crossed out, is very different, and is *S. Thunbergii*, Choisy! (in DC. Prodr. xii. p. 9), in part at least. It has nothing to do with the description of *S. fruticosa*, L.

P. 89. *Lippia ovata*, L.! Four specimens on one sheet. It is the *Selago capitata*, Berg., *S. ovata*, Thunb.!, and MICRODON OVATUS, *Choisy*!, and correctly understood by authors.

Species originally published in Linnæus's 'Systema Naturæ,' ed. 13, vol. ii. (1770).

P. 420. HEBENSTREITIA CORDATA, *L.*! One specimen, from a garden. Correctly understood by authors.

Species originally published in Linnæus's 'Mantissa Plantarum,' part 2, p. 143 to end (1771).

P. 171. *Eranthemum parvifolium*, L. Not seen. It is merely a repetition of *E. parviflorum*, Berg., with a change of name, and still doubtful (*vide supra*, p. 345).

E. angustatum, L.! One specimen. It is only *Selago dubia*, L.! with the name changed, and AGATHELPIS ANGUSTIFOLIA, *Choisy*!

P. 250. SELAGO POLYSTACHYA, *L.*! Three specimens on three sheets. Meyer incorrectly calls it *S. cinerea*, Thunb., quoting *S. polystachya*, L., as a variety of *S. corymbosa*, L., which variety only differs in having a little shorter leaves. Choisy follows Meyer in both these mistakes. The *S. cinerea*, L. fil.!, Thunb.!, is made a new species by Meyer as *S. cinerascens*!; but the latter name is misunderstood by Choisy, who used it with a ? for the same plant, which a little later he called "*S. canescens*, L. ?, Thunb. ?, E. Mey.!," and still later made a new species as S. ALBIDA, *Choisy*. Thus nos. 8, 14, and 58 in De Candolle's 'Prodromus' are the same species.

S. fasciculata, L.! Two specimens on two sheets. It is evidently S. SERRATA, *Berg.*; and though I find no trace of the type specimen of Bergius, his ample description is sufficient to identify it. Choisy quotes the latter as a synonym of the former; but as the name given by Bergius is four years prior to that of Linnæus, it must take precedence. Correctly understood by authors, except that Meyer's var. *hirta* is distinct, and is S. QUADRANGULARIS, *Choisy*! (in DC. Prodr. xii. p. 15). The Linnæan Herbarium also contains the following additional species:—

SELAGO CILIATA, *L. fil.*! *Suppl. Pl.* p. 285. One specimen, correctly named.

S. VERBENACEA, *L. fil.*! *Suppl. Pl.* p. 285. One specimen, correctly named.

Hebenstreitia spicata, Thunb.! Prodr. Pl. Cap. p. 103. One specimen, incorrectly named "*H. ciliata*," presumably of Bergius, but quite different. A second sheet of one specimen labelled as the last, "*H. ciliata*," is again different, and is *H. capitata*, Thunb.!

H. capitata, Thunb.! Prodr. Pl. Cap. p. 103. Besides the specimen mentioned in the preceding note, there are three additional ones correctly named, and containing several specimens, on one of which is written "Commel. Hort. ii. p. 119, t. 60;" but the figure does not represent this plant, and still remains doubtful, as I have pointed out (*vide supra*, p. 345).

In the cover of *Hebenstreitia* is a specimen without generic name, labelled by Linnæus "*polystachya*." It does not affect the description of *Selago polystachya*, L., and *S. spuria*, L.

Species originally published in Linnæus filius's 'Supplementum Plantarum' (1781).

With the exception of *Bartsia Gymnandra*, L. fil., the whole of the following species were described from Thunberg's herbarium, where they still remain in an excellent state of preservation. They are therefore the types of Thunberg's works also.

P. 278. *Bartsia Gymnandra*, L. fil.! In the Linnæan Herbarium is a sheet sent by Pallas, who says, "*Lagotis glauca*, Gærtner, mihi in Itinere, vol. iii. nomine Gymnandræ descripta. In terris arcticis circa Obum in Alpib. Davisiæ summis in Kamtsch. crescit." This sheet consists of a specimen of LAGOTIS GLAUCA, *Gærtner, in Nov. Comm. Act. Petrop.* xiv. p. 553, t. 18 (1770), *Gymnandra Gmelini*, Cham. et Schlecht. in Linnæa, ii. p. 561, on the right-hand side, and two specimens of *Gymnandra borealis*, Pall., Reise Prov. Russisch. Reichs, iii. p. 710, t. A. fig. 1 (1776), on the left-hand side, the plants represented by these figures respectively. Thus *Bartsia Gymnandra*, L. fil., represents two plants. *Lagotis*, as the older name by six years, takes the precedence. *G. borealis*, Pall., is L. PALLASII, *Rupr. Sert. Tianschan.* p. 64 (in note).

P. 284. SELAGO DIVARICATA, *L. fil.*! One specimen. Choisy did not know this species, as he erroneously refers it to *S. triquetra*, L. fil.

S. CANESCENS, *L. fil.*! There are two sheets labelled "*Selago canescens*," one with two specimens on, the other with one, which I consider the types, as they agree with the short description. On the right-hand side of this latter sheet is a specimen of *S. adpressa*, Choisy!, which is also part of E. Meyer's *S. tephrodes*! (from locality "*b*"!), a species founded on three distinct plants. The *S. canescens* of E. Meyer! and of Choisy! is another plant, which is identical with S. ALBIDA, *Choisy* in DC. Prod. xii. 18. Choisy appears to have called the true *S. canescens*, L. fil., *S. glabrata*, as he says "v. s. in h. DC. ex Thunb. sub falso nom. *S. canescens*;" but not having seen Choisy's specimen, I cannot be sure of it. A specimen from Thunberg, under the name *S. canescens*, in the British Museum is correct.

S. GENICULATA, *L. fil.*! Two specimens on one sheet. Both E. Meyer! and Choisy! misunderstood this plant; the former invented a new name, *S. leptostachya*!, for it; the latter wrongly adopting *S. polygaloides*, L. fil.! for part of it, retaining Meyer's name for the other part!

S. TRIQUETRA, *L. fil.*! Two specimens on one sheet. Rightly understood both by Meyer! and Choisy!, except that the latter wrongly quotes *S. divaricata*, L. fil., as a synonym.

S. HISPIDA, *L. fil.*! Three specimens on one sheet. Neither Choisy nor Meyer understood this plant. Choisy's *S. hispida*! is S. STRICTA, *Bergius*!; and that part of Meyer's *S. tephrodes* from locality "*c*"! is the same plant.

S. polygaloides, L. fil.! Four specimens on two sheets, which are the MICRODON CYLINDRICUS, *E. Mey.*!, though Meyer did not know it under the Linnæan name. Choisy's *S. polygaloides*! is S. GENICULATA, *L. fil.*! (*vide supra*).

P. 285. S. CINEREA, *L. fil.*! Two specimens on one sheet. Misunderstood by Choisy! and Meyer!, both of whom wrongly used the name for *S. polystachya*, L.! (*vide supra*). Meyer renamed it *S. cinerascens*! Choisy also misunderstood this plant of Meyer's, and used it with a "?" for the same plant, which he afterwards named "*S. canescens*, L.? Thunb.? E. Mey.!" Thus nos. 8 and 14 in De Candolle's 'Prodromus' are the same plant; and are identical with no. 58, S. ALBIDA, *Choisy*.

S. ROTUNDIFOLIA, *L. fil.*! Three specimens on one sheet. A marked species, rightly understood by Meyer, and afterwards by Choisy, though not in his early monograph, where it is quoted with a "?" as a synonym of *Microdon lucidus*, Choisy. A second sheet containing two specimens is labelled "*S. rotundifolia*," but afterwards erased by a pencil-line; but the words "corymbo composito" prove that it has nothing to do with the description. It is the *S. bracteata*, Thunb., and MICRODON LUCIDUS, *Choisy*!

S. CILIATA, *L. fil.* Four specimens on one sheet. Rightly understood by authors

S. VERBENACEA, *L. fil.*! Two specimens on one sheet. Rightly understood by authors.

S. HIRTA, *L. fil.*! Two specimens on one sheet. Choisy, in his early Monograph (Mem. Selag. p. 37), referred another plant to this name, which Meyer corrected, although he wrongly made it a variety of *S. fasciculata*, L. In De Candolle's 'Prodromus' (p. 16) Choisy accepted Meyer's determination of the true *S. hirta*, L. fil., but gave the name S. QUADRANGULARIS! to Meyer's variety *hirta*!, though he again complicated matters by wrongly accepting as *S. decumbens*, Thunb., some specimens in the Berlin Herbarium under that name. Thus nos. 42 and 56 in De Candolle's 'Prodromus' are both *S. quadrangularis*, Choisy.

P. 286. *Hebenstreitia erinoides*, L. fil.! One specimen of DISCHISMA FLACCUM, *E. Mey.*!, though Meyer did not know it under the Linnæan name. Choisy wrongly refers "*H. erinoides*, Berg. et Linn. Suppl. p. 286," to *Dischisma ciliatum*, and "*H. erinoides*, Thunb. Fl. Cap. 478? non Berg.," to *D. chamædryfolium*, Walp.; but there is no *H. erinoides*, Berg., whose book is four years older, and the plant of L. fil. and Thunb. is one identical specimen; besides which *D. chamædryfolium*, Walp., is identical with *D. flaccum*, E. Mey., though Choisy keeps them distinct.

H. fruticosa, L. fil. Two specimens on one sheet, labelled "*Selago fruticosa*," but the type of the description nevertheless. It is, however, a true *Dischisma*, which I propose to call D. FRUTICOSA. Neither Meyer nor Choisy understood the plant; Meyer's "*H. fruticosa* (Thunb.?), Sims!," is not the plant of L. fil., and Choisy simply followed Meyer.

Species originally published in Murray's 'Systema Naturæ' (1784). This work is the fourteenth edition of Linnæus's 'Syst. Nat.' and usually misquoted "Linn."

P. 57. *Eranthemum angustifolium*, Murr. Founded on *Selago dubia*, L.!, and is AGATHELPIS ANGUSTIFOLIA, *Choisy*!

Species originally published in Thunberg's 'Prodromus Plantarum Capensium (1794)*.

P. 99. SELAGO ARTICULATA, *Thunb.*! Two specimens on one sheet. Choisy enumerates this among the "*Species minus notæ*;" but his *S. geniculata* is the same plant. The true *S. geniculata*, L. fil., he wrongly calls *S. polygaloides*, L. fil.

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* Thunberg's herbarium is in one respect very puzzling. Some of the book-names do not appear on the sheets at all; so that the first impression received is that the herbarium is not complete, and that Thunberg had more than one plant represented by many of his names (this he had in some instances, but not in so many as his herbarium would lead one to infer): *Hebenstreitia fruticosa*, *H. scabra*, and *Selago bracteata* would appear to be missing; while *S. rotundifolia* would seem to represent 2 species, and *S. fruticosa* 3 species of 2 genera (see

S. DIFFUSA, *Thunb.*! There are three sheets under this name: sheet α contains three specimens, sheet β one specimen, which I shall consider the types, as they agree with the description. I have not seen Choisy's specimen, but his description agrees admirably. Thunberg's sheet γ is another species, for which I find no name. The following description will serve to identify it, though I have only met with this single example as yet:—

S. NIGRESCENS, sp. nov.—Perennis, ramulis virgatis dense cinereo-puberulis; foliis solitariis subadpressis linearibus obtusis carinatis lævibus; spicis terminalibus elongatis v. oblongis densis, bracteis lineari-lanceolatis acutis ciliatis; calyce campanulato hirsuto 5-fido segmentis parum inæqualibus subulatis acutis; corollæ tubo gracili, segmentis oblongis quam tubus triplo brevioribus; staminibus styloque breviter exsertis.

Ad Cap. b. spei. *Thunberg*!

Fruticulus. Folia nigrescentia, 1–2 lin. longa. Spica 1–2 poll. longa. Bracteæ 1½ lin. longæ. Calyx ¾ lin. longus. Corolla 2 lin. longa.

Although the name "*Selago diffusa*" appears on the sheet, it does not appear to have any thing to do with the description of that plant, of which Thunberg says "ramis diffusis."

S. SCABRIDA, *Thunb.*! Two sheets with three specimens. Both Meyer and Choisy rightly understood the species; but the latter described a new species as *S. glandulosa*! (DC. Prodr. p. 20) from a vigorous specimen of this plant with abortive spikes and a few

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notes under those species). The following appears to me to be the explanation of the difficulty:—Thunberg first identified, as far as he could, his plants with previously described ones, giving new names to the remainder; all of the names he wrote with ink at the bottom right-hand corner of the sheet. Afterwards, in his 'Prodromus' (and later in the MSS. of his 'Flora Capensis'), some discrepancies were discovered and rectified; but the corrections were not noted on the sheets at the time, and never afterwards checked from the book. Adopting this hypothesis, which has been arrived at by a careful and exhaustive comparison, not a single species is missing. For an example, see remarks on a later page under *Hebenstreitia scabra*, Thunb. One reason why I call special attention to the above is, that the same difficulty occurs in other orders received at Kew for comparison, and doubtless throughout his herbarium, thus providing innumerable pitfalls for any one working with it, unless each plant is carefully compared with the corresponding description, and *vice versâ*.

flowers in the axils of the upper leaves. The type is in the Berlin Herbarium.

S. GLOMERATA, *Thunb.*! Two specimens on one sheet. Meyer's plant from locality "*a*" is this species. From locality "*b*" is a distinct plant referred by him to *S. glomerata*, Thunb. Choisy fell into the same mistake, as I have seen specimens of both authenticated by him. The latter plant may be characterized as follows:—

S. DREGEI, sp. nov.—Perennis, ramulis cinereo-hirsutis v. puberulis; foliis fasciculatis subacicularibus v. oblongis subobtusis asperis; corymbis amplis densis v. laxis, bracteis lineari-lanceolatis acutis setulosis; calyce dense hirsuto 5-partito segmentis subulatis; corollæ tubo gracili, segmentis oblongis tubo dimidio brevioribus; staminibus styloque breviter exsertis. *S. glomerata*, E. Mey. Comm. p. 264, partim! Choisy in DC. Prodr. xii. p. 9, partim! *non* Thunb.

Ad Cap. b. spei; inter Klaasniemandfontein et Bethelsdorp, 500–800 ped. *Drège*! "Zoetmelk's River in collibus. Fruticulus pedalis. Flores albi." *Burchell*! no. 6748. *Zeyher*! n. 3564. Uitenhage, *Harvey*! no. 807. *Dr. Thom*! nos. 293, 323.

Fruticulus patens. Folia 1–4 lin. longa. Corymb 2–2½ poll. diam. Bracteæ 1½–2 lin. longæ. Calyx 1 lin. longus. Corolla 2–3 lin. longa.

S. PANICULATA, *Thunb.*! Two species on one sheet. Meyer renamed this species *S. Choisyana*!, a name accepted by Choisy, who refers *S. paniculata* with a ? to a plant which he considers to be the *S. stricta*, Berg.; it is not that plant, however, but that part of *S. tephrodes*, E. Mey.! from locality "*a*"! and for which I shall retain Meyer's name. The part from locality "*b*" is *S. adpressa*, Choisy, and from "*c*"! *S. stricta*, Bergius!

S. ovata, Thunb.! Two specimens on one sheet of MICRODON OVATUS, *Choisy*! It is founded on *Lippia ovata*, L.! and *Selago capitata*, Bergius; and although the latter is missing from the Herbarium of Bergius, I have no doubt Thunberg is correct in quoting it.

S. angustifolia, Thunb.! Two specimens on two sheets of AGATHELPIS ANGUSTIFOLIA, Choisy! It is founded on *Selago dubia*, L.! and *Eranthemum angustifolium*, Murr., and correctly so.

S. heterophylla, Thunb.! A single specimen, which is a young seedling, seven inches high, of S. SPURIA, *L.*! It is in bud, and has the broad serrate radical leaves so characteristic of this species when young, but which are rarely present in herbarium specimens. The plant called *S. heterophylla* by E. Meyer! is distinct, and the name may be retained, as that of Thunberg must give way.

S. pusilla, Thunb.! Four small specimens on one sheet of VANDELLIA SCABRA, *Benth.*! They are young seedlings, scarcely two inches high, with a flower each, and two of them with a second bud. They are labelled "e Cap. b. spei. Tunberg" (*sic*). I have seen no other specimens from the Cape. Choisy classes it with "*Species minus notæ.*"

P. 100. S. CEPHALOPHORA, *Thunb.*! Six specimens on two sheets. Choisy rightly understood this species. Meyer described a distinct plant under this name, which Choisy apparently never saw, and which I have only seen from Drège's collections. As the latter has a nodding spike I propose to call it S. NUTANS.

S. cordata, Thunb.! A single specimen of PHYLLOPODIUM HETEROPHYLLUM, *Benth.*! Both Meyer and Choisy used the name for the next species, *S. decumbens*, Thunb., and Choisy further used the name *S. decumbens*, Thunb., for his own *S. quadrangularis*. Thus nos. 42 and 56 in DeCandolle's 'Prodromus' are the same species.

S. DECUMBENS, *Thunb.*! Three specimens on one sheet. Both Meyer and Choisy wrongly called this *S. cordata*, Thunb. See note under the preceding species.

S. bracteata, Thunb. Two specimens on one sheet. It has been labelled by Thunberg "*S. rotundifolia*," and afterwards erased by two pencil lines; and although the correct name is not on the sheet, it is nevertheless the type of the description. Choisy has correctly referred it to his MICRODON LUCIDUS! in his later Monograph, though he appears not to have known of it in his early one, when he founded the latter genus; and, moreover, he quotes "*S. rotundifolia*? L. f." in his early work, a mistake afterwards corrected by Meyer. That it has nothing to do with the description of the true S. ROTUNDIFOLIA, *L. fil.*, is sufficiently proved by the words "corymbo composito" under that species.

P. 103. *Hebenstreitia scabra*, Thunb. Two specimens on one sheet. The name "*Hebenstretia integrifolia*" is the only one on the sheet; but still it is the type of the description, the words "foliis ciliato-scabris" alone separate it from all the rest. I have not seen the specimen quoted by Choisy as this species; but by his description it would seem quite different. That it is not the plant meant by Thunberg as *H. integrifolia* in his writings is apparent from the fact that he simply quoted the name as a synonym of *H. dentata*; and this latter name, as used by Thunberg, does not represent the plant of Linnæus at all, which is not in Thunberg's Herbarium, but a plant afterwards named by Choisy *Polycenia hebenstreitioides*! (*vide infra*, p. 356). However, I believe *H. integrifolia*, L., is the correct name for this species, for reasons set forth on p. 343.

H. spicata, Thunb.! Two specimens on one sheet of DISCHISMA SPICATUM, *Choisy*!

H. capitata, Thunb.! Five specimens on one sheet of DISCHISMA CAPITATUM, *Choisy*!

All the names of Linnæus fil. which were described from Thunberg's Herbarium are enumerated by the latter in his 'Prodromus.' The remarks under those species apply therefore to them. The following older species are also here enumerated by Thunberg; two of them, however, are not the plants of Linnæus, which he does not appear to have known:—

S. CORYMBOSA, *L.*! *Sp. Pl.* ed. 1, p. 629. Two specimens on one sheet. Correct.

S. fruticosa, presumably of Linnæus, but totally different; and moreover there are two species represented by the name, each on different sheets. Both appear to be undescribed. Sheet "1" contains one specimen, which I will designate

S. CAPITULIFLORA, sp. nov.—Perennis, ramulis minute puberulis demum glabratis; foliis fasciculatis anguste linearibus obtusis revolutis lævibus; capitulis parvis post anthesin parum elongatis, bracteis ovatis subobtusis concavis vix ciliatis; calyce 5-partito hispidulo segmentis oblongis obtusis ciliatis; corollæ tubo brevi, segmentis obovato-oblongis tubo fere æqualibus; staminibus styloque breviter exsertis. *S. fruticosa*, Thunb. partim! non L.

Ad Cap. b. spei. *Thunberg*!

Fruticulus. Folia sparsa, 2–4 lin. longa. Capitula ad apices ramorum laxe disposita, 3 lin. diam. Bracteæ 1 lin. longæ. Calyx ½ lin. longus. Corolla 1½ lin. longa.

Sheet "2" contains one specimen, which I will describe as

S. CONGESTA, sp. nov.—Perennis, ramulis puberulis; foliis fasciculatis subulato-linearibus obtusis lævibus; spicis terminalibus ovoideis densissimis, bracteis lineari-lanceolatis acutis hispidis; calyce profunde 2-partito (segmento postico deficiente) segmentis linearibus obtusis concavis hispidis; corollæ tubo gracili, segmentis obovato-oblongis tubo dimidio brevioribus; staminibus styloque breviter exsertis. *S. fruticosa*, Thunb. partim! non L.

Ad Cap. b. spei. *Thunberg*!

Fruticulus rigidus. Folia 1½–2½ lin. longa. Spica 6 lin. longa. Bracteæ 1½ lin. longæ. Calyx 1 lin. longus. Corolla 2 lin. longa.

S. SPURIA, *L.*! *Sp. Pl.* ed. 1, p. 629. Four specimens on two sheets. Correct.

S. rapunculoides, L.! Amœn. Acad. iv. p. 313. Seven specimens on four sheets. Correct, but only a vigorous form of S. SPURIA, *L.*

S. fasciculata, L.! Mant. p. 250. Three specimens on one sheet. Correct; but S. SERRATA, *Berg.*, is the older name.

Hebenstreitia dentata, presumably of Linnæus, but totally different. There are four sheets. Sheet "*a*" contains two distinct species. At the top of the sheet in the centre is a specimen of the plant described by Choisy (in DC. Prodr. xii. p. 16) as *Selago squarrosa*!; but it is a true *Hebenstreitia*, and is H. RAMOSISSIMA, *Jarosz, Pl. Nov. Cap.* p. 14. The remaining four plants, as well as six specimens on the three other sheets, are all Choisy's *Polycenia hebenstreitioides*!, the type of a genus founded on the presence of lacunæ in the nutlets, an insufficient character, which breaks down in another species. It is H. REPENS, *Jarosz, Pl. Nov. Cap.* p. 15.

H. ciliata, Berg.! Pl. Cap. p. 154. Four specimens on one sheet of DISCHISMA CILIATUM, *Choisy*. Correct.

H. CORDATA, *L.*! *Syst. Nat.* ed. 13, ii. p. 420. Two specimens on one sheet. Correct.

Thunberg's 'Flora Capensis' (1828) contains only an enumeration of the species of his 'Prodromus,' with the descriptions amplified and the localities in many cases added. One additional species, however, occurs, viz.:—

SELAGO STRICTA, *Berg.*! *Pl. Cap.* p. 155. One specimen. Correct.

The following species is omitted, no doubt accidentally :— *Hebenstreitia spicata,* Thunb. Prodr. Pl. Cap. p. 103.

APPENDIX.

The following tabulated list shows the revised synonymy (of those species where alterations have been made) as compared with Choisy's last monograph. In species not here tabulated no change has been made.

HEBENSTREITIA DENTATA, *L.*

H. INTEGRIFOLIA, *L.* (*H. scabra,* Thunb., *H. aurea,* Andr.).

H. RAMOSISSIMA, *Jarosz* (*Selago squarrosa,* Choisy).

H. REPENS, *Jarosz* (*H. dentata,* Thunb. excl. syn., non L.; *Polycenia hebenstreitioides,* Choisy).

DISCHISMA CILIATUM, *Choisy* (*D. hispidum,* Choisy).

D. FLACCUM, *E. Mey.* (*D. chamædryfolium,* Walp.; *Hebenstreitia erinoides,* L. fil.).

D. FRUTICOSA, *Rolfe* (*Hebenstreitia fruticosa,* L. fil., non Sims, E. Mey. nec Choisy).

SELAGO CORYMBOSA, *L.*

S. SPURIA, *L.* (*S. rapunculoides,* L.; *S. coccinea,* L.; *S. heterophylla,* Thunb., non E. Mey.).

S. STRICTA, *Berg. non Choisy* (*S. tephrodes,* E. Mey. partim; *S. hispida,* Choisy, non L. fil.).

S. SERRATA, *Berg.* (*S. fasciculata,* L.).

S. FRUTICOSA, *L., non Thunb., E. Mey. nec Choisy* (*S. recurva,* Choisy, non E. Mey.).

S. POLYSTACHYA, *L.* (*S. cinerea,* E. Mey., non Thunb.).

S. ALBIDA, *Choisy* (*S. canescens,* E. Mey., non L. fil.; *S. cinerascens,* Choisy, non E. Mey.).

S. QUADRANGULARIS, *Choisy* (*S. decumbens,* Choisy, non Thunb.).

S. DIVARICATA, *L. fil.*

S. CANESCENS, *L. fil., non E. Mey.*

S. GENICULATA, *L. fil., non Choisy* (*S. leptostachya,* E. Mey.; *S. polygaloides,* Choisy, non L. fil.).

S. TRIQUETRA, *L. fil.*

S. HISPIDA, *L. fil., non Choisy* (*S. tephrodes,* E. Mey. partim).

S. CINEREA, *L. fil.* (*S. cinerascens,* E. Mey., non Choisy).

S. ARTICULATA, *Thunb.* (*S. geniculata,* Choisy, non L. fil.).

S. NIGRESCENS, *Rolfe.*

S. SCABRIDA, *Thunb.* (*S. glandulosa,* Choisy).

S. GLOMERATA, *Thunb.*

S. DREGEI, *Rolfe* (*S. glomerata,* E. Mey. partim, non Thunb.).

S. PANICULATA, *Thunb.* (*S. Choisyana,* E. Mey.).

S. HETEROPHYLLA, *E. Mey., non Thunb.*

S. CEPHALOPHORA, *Thunb., non E. Mey.*

S. NUTANS, *Rolfe* (*S. cephalophora,* E. Mey., non Thunb.).

S. DECUMBENS, *Thunb.* (*S. cordata,* E. Mey., non Thunb.).

S. CAPITULIFLORA, *Rolfe* (*S. fruticosa,* Thunb. partim, non L. nec Choisy).

S. CONGESTA, *Rolfe* (*S. fruticosa,* Thunb. partim, non L. nec Choisy).

MICRODON CYLINDRICUS, *E. Mey.* (*Selago polygaloides,* L. fil., non Choisy).

AGATHELPIS ANGUSTIFOLIA, *Choisy* (? *A. parvifolia,* Choisy).

LAGOTIS GLAUCA, *Gærtn.* (*Gymnandra Gmelini,* Cham. et Schlecht.; *Bartsia Gymnandra,* L. fil. partim).

L. PALLASII, *Rupr.* (*Gymnandra borealis,* Pall.; *Bartsia Gymnandra,* L. fil. partim).

GLOBULARIA VULGARIS, *L.* (*G. bisnagarica,* L.).

Species excluded from the Order.

LYPERIA FRAGRANS, *Benth.* (*Selago lychnidea,* L.).

VANDELLIA SCABRA, *Benth.* (*Selago pusilla,* Thunb.).

PHYLLOPODIUM HETEROPHYLLUM, *Benth.* (*Selago cordata,* Thunb., non E. Mey.).

Recent Additions to our Knowledge of the Flora of Fiji.

By J. G. BAKER, F.R.S., F.L.S.

[Read December 21, 1882.]

IN the year 1877 Mr. John Horne, F.L.S., the Superintendent of the Botanic Garden of Mauritius, spent, at the invitation of Sir Arthur Gordon, the Governor, a year at Fiji, his principal object being to investigate and prepare a Report on the economic capabilities of the islands from a botanical point of view. He visited many districts which had not been previously explored botanically and brought home to England a large collection of specimens. This was classified at the Kew Herbarium; but there has been no time or opportunity for a careful critical examination of such of the Flowering plants * as were not identified at once by comparison with the Herbarium and Seemann's 'Flora.' In his report, which was published as a book in 1881, under the title of 'A Year in Fiji,' Mr. Horne has given a catalogue of Fijian plants, in which he has entered a considerable number of these under new names. I need not, of course, point out to the Members of the Linnean Society that to publish new names without descriptions is entirely contrary to the accepted rules of nomenclature.

As in the present case there is no possible means of ascertaining what these names mean except by consulting the Kew specimens, I have, at Sir Joseph Hooker's wish, drawn up the report upon them which I now lay before the Society. A few of the species I have been able to identify, and of the others I have given such characters as the material at command will allow. At the time that the collection was compared, Mr. Hiern examined the Ebenaceæ, and Mr. Le Marchant Moore the Orchids. The former characterized one, and the latter two species they regarded as new, and an abstract of their notes is included. The seven Cyrtandraceæ newly named by Mr. Horne have been already similarly dealt with by Mr. C. B. Clarke in the Monograph of the order now in course of printing, which he has prepared for the continuation of DeCandolle's 'Prodromus;' and for a note on a new *Pandanus* found and named by Mr. Horne I am indebted to Prof. I. Bayley Balfour [see page 416].

PARKIA PARRII (*Horne*, '*A Year in Fiji*,' p. 266).

P. foliis glabris, pinnis 6–7-jugis, foliolis oblongis 12–16-jugis rigide coriaceis, bracteis apice sericeis, legumine semipedali duro glabro.

A large tree, with a dark-coloured trunk, 40 to 70 feet in height, the branchlets furnished with copious brown lenticels. Leaf a foot long, the rhachis quadrangular, dark purplish brown; petiole 2 in. long, with a few brown lenticels, but without any patellæform glands; pinnæ 4–5 in. long; leaflets sessile, oblong, easily disarticulating, $\frac{1}{2}$–$\frac{5}{8}$ in. long, $\frac{1}{3}$ in. broad, nearly square on the lower side at the base, more rounded on the upper. Peduncles glabrous, nearly black, attaining a length of half a foot or more. Heads turbinate, 1$\frac{1}{2}$–2 in. long; bracts of the fertile flowers $\frac{1}{4}$–$\frac{1}{3}$

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* A paper of mine on the Ferns of the collection will be found in Trimen's 'Journal of Botany,' 1879, pp. 292–300.

in. long, dilated suddenly at the tip into a transversely oblong appendage, densely coated with brown silky pubescence; lower empty bracts much smaller, with a claw as long as the orbicular blade. Flowers white or rose-coloured, $\frac{1}{4}$ in. long. Calyx about half as long as the corolla, the segments of which cohere to the middle. Stamens free, with filiform filaments more than twice as long as the linear-oblong anthers. Legume flat, linear-oblong, coriaceous, $\frac{1}{2}$ ft. long, $1\frac{1}{2}$ in. broad, 10–12-seeded, narrowed gradually into a short stalk.

Hab. Parr's coffee-plantation, Viti Levu, and near streams at Bua, Vanua Levu, *Horne* 1041! This fine genus is new to Polynesia, but known in America, Asia, and Africa. This a well-marked species.

DOLICHOLOBIUM KNOLLYSII (*Horne, 'A Year in Fiji,'* p. 260).

Arborea, glabra, ramulis ancipitibus, stipulis magnis obovatis obtusis foliaceis persistentibus, foliis breviter petiolatis magnis oblongis, floribus 2–3nis racemosis axillaribus magnis albis fragrantibus, ovario cylindrico, calycis limbo integro late patellæformi.

A small tree, glabrous in all its parts, with the branchlets remarkably flattened and acutely 2-angled towards the tip. Stipules obovate, obtuse, persistent, subcoriaceous, 1–$1\frac{1}{2}$ in. long. Petiole stout, $\frac{1}{2}$ in. long; blade oblong, subobtuse, narrowed gradually from the middle to the base, 6–9 in. long, 2–3 in. broad at the middle, moderately firm in texture, green and glabrous on both surfaces, with ascending main veins distinct from midrib to margin about $\frac{1}{2}$ in. apart. Flowers 2–3 together in axillary racemes with a peduncle about as long as the stipules, large, white, and fragrant, according to Mr. Horne's note; but his specimens only show the cylindrical ovary in a very immature state, crowned by a membranous entire patellæform calyx-limb, which is $\frac{1}{2}$ in. diam. at the throat.

Hab. Forests in the vicinity of Suva, Viti Levu, *Horne,* 729 *a.* Capt. Knollys, after whom this is named, is Aide-de-camp to Sir Arthur Gordon.

DOLICHOLOBIUM MACGREGORI (*Horne, 'A Year in Fiji,'* p. 261).

Arborea, glabra, ramulis validis tetragonis, stipulis magnis oblongis foliaceis persistentibus, foliis breviter petiolatis magnis obovato-oblongis, floribus 3–4nis axillaribus racemosis magnis albis suaveolentibus, ovario longissimo cylindrico, calycis limbo magno patellæformi.

A tree, about 20 feet in height, glabrous in all its parts, with stout 4-angled branchlets. Stipules oblong, obtuse, foliaceous, persistent, 2 inches long. Petiole stout, under an inch long; blade obovate-oblong, reaching a foot in length by half as broad, obtuse, narrowed gradually from the middle to a slightly rounded base, moderately firm in texture, green and glabrous on both surfaces, with ascending parallel veins distinct from the midrib to margin, about $\frac{3}{4}$ in. apart. Flowers 3–4 in axillary racemes with a common peduncle 2–3 in. long, and short ascending pedicels, large, white, and very fragrant, according to Mr. Horne's note; but his specimens show only the immature fruit, which is a cylindrical coriaceous capsule, 9–10 inches long, $\frac{1}{4}$ in. in diameter, crowned by the large patellæform calyx-limb.

Hab. Banks of the Tamavua river, near Suva, Viti Levu, *Horne* 690! Dr. Macgregor, after whom this is named, is the chief medical officer of Fiji.

GARDENIA GORDONI (*Baker*).

Arborea, inermis, glabra, stipulis magnis connatis persistentibus, foliis distincte petiolatis oblongis acutis magnis basi deltoideis, floribus octomeris, fructu magno duro subgloboso costato, calycis segmentis brevibus basi connatis coronato.

Garcinia Arthurgordoni, *Horne*, '*A Year in Fiji*,' p. 262 (nomen solum).

A tree 20–25 feet high, glabrous in all its parts, with free smooth branchlets. Stipules forming a persistent ring $\frac{1}{3}$ in. long tightly wrapped round the stem above the base of the pair of petioles. Petiole nearly an inch long; blade 6–8 in. long, $2\frac{1}{2}$–3 in. broad at the middle, narrowed to the base and apex, subcoriaceous, green on both surfaces, the conspicuous main veins ascending and parallel from midrib to margin, about $\frac{1}{2}$ inch apart. "Flowers white, $3\frac{1}{2}$ in. in diam., with an 8-lobed corolla and 8 stamens. Fruit hard, brown, subglobose, $1\frac{1}{2}$ in. long and broad, with 5 distinct raised vertical ribs, crowned by the short calyx-segments, which are connate for $\frac{1}{4}$–$\frac{1}{3}$ in., and filled with very numerous small discoid oblong-orbicular seeds with a pitted dull brown testa.

Hab. Island of Rabi, at 400 feet above sea-level, *Horne* 499! In Mr. Horne's printed catalogue, which was arranged alphabetically, the name was accidentally changed from *Gardenia* to *Garcinia*.

GARDENIA GRIEVEI (*Horne*, '*A Year in Fiji*,' p. 262).

Fruticosa inermis glabra, stipulis parvis connatis, foliis breviter petio-

latis oblongis subacutis basi deltoideis, floribus axillaribus breviter pedunculatis, fructu globoso, calycis segmentis 3 rigidulis lanceolatis basi solum connatis.

A shrub, about 5 feet high, glabrous in all its parts, with slender terete branchlets. Stipules forming a ring not more than $\frac{1}{12}$ in. long; petiole under $\frac{1}{2}$ in. long; blade oblong, obtusely cuspidate, 2–4 in. long, 1–$1\frac{1}{2}$ in. broad at the middle, moderately firm in texture, with main veins distinct from midrib to margin $\frac{1}{4}$–$\frac{1}{3}$ in. apart. Flowers solitary in the axils of the leaves on ascending peduncles under $\frac{1}{2}$ in. long. Fruit quite globose, rigid in texture, under an inch in diameter, crowned by three lanceolate rigid brown calyx-segments, which are about $\frac{1}{2}$ in. long and free nearly to the base.

Hab. Common on poor land in the district of Bua, Vanua Levu, *Horne*, 1094. Allied to *G. taitensis*, DC., which is also a Fiji species.

GARDENIA GORRIEI (*Horne, 'A Year in Fiji,'* p. 262).

Arborea, inermis, glabra, stipulis magnis connatis persistentibus, foliis magnis petiolatis oblongis basi deltoideis, floribus solitariis axillaribus, fructu magno duro globoso costato calycis limbi segmentis 5 magnis rigidulis lanceolatis basi solum connatis coronato.

A tree 30–40 feet high, with stout branchlets, glabrous in all its parts. Stipules united in a persistent brown ring, $\frac{1}{4}$–$\frac{1}{3}$ in. long above the node. Petiole $\frac{1}{2}$–$\frac{3}{4}$ in. long; lamina about half a foot long, $2\frac{1}{2}$–3 in. broad at the middle, moderately firm in texture, green on both surfaces, with main veins distinct to the edge, $\frac{1}{3}$–$\frac{1}{2}$ in. apart. Flowers solitary in the axils of the leaves on peduncles an inch long. Corolla not seen. Fruit woody in texture, globose, $1\frac{1}{4}$–$1\frac{1}{2}$ in. long and broad, with 5 raised vertical ribs, crowned by the persistent calyx-limb, which consists of five lanceolate brown segments as long as the ovary and connate only at the very base.

Hab. Near Rukurupu Wai-ni-mala, Viti Levu, *Horne* 999!

GARDENIA HILLII (*Horne, 'A Year in Fiji,'* p. 262).

Arborea, inermis, glabra, ramulis teretibus gracilibus, stipulis parvis, foliis petiolatis obovato-oblongis cuspidatis basi deltoideis, floribus axillaribus solitariis pedunculatis, calycis limbo segmentis 3 lanceolatis basi in urceolum connatis, corollæ tubo subcylindrico segmentis 5 oblanceolato-oblongis quam tubus duplo longioribus.

A small tree, 15–20 feet high, with slender terete branchlets, glabrous in all its parts. Stipules forming a very short persistent ring above the nodes: Leaves shortly petioled, 2–3 in. long, 1–1½ in. broad, moderately firm in texture, green and glabrous on both surfaces, with main veins distinct nearly to the edge, ¼–⅛ in. apart. Flowers solitary in the axils of the leaves, on slender ascending peduncles ⅓–½ in. long. Calyx of three lanceolate foliaceous segments about ½ in. long, which unite so as to form a companulate tube ¼ in. long above the globose ovary. Corolla white, fragrant, with a subcylindrical tube ½ in. long, which is pilose inside at throat, and 5 oblanceolate-oblong segments an inch long. Fruit not seen.

Hab. Common in some parts of the island of Rabi, high up the mountains, *Horne* 452! Named after the proprietor of that island.

PLECTRONIA MACGREGORI (*Horne, 'A Year in Fiji,'* p. 266).

Fruticosa, glabra, stipulis minutis, foliis breviter petiolatis ovato-oblongis acuminatis subcoriaceis, floribus minutis in axillis foliorum fasciculatis breviter pedicellatis, calycis tubo brevi, dentibus 5 deltoideis, corollæ intus pilosæ tubo campanulato, segmentis lanceolatis.

A shrub, about 8 feet high, with slender terete woody branchlets, glabrous in all its parts. Stipules minute, deltoid. Leaves shortly petioled, 2–3 in. long, 1–1½ in. broad, rounded at the base, subcoriaceous in texture, green on both surfaces, with distant fine ascending main veins. Flowers in copious axillary umbellate fascicles; pedicels slender, $\frac{1}{12}$–⅛ in. long. Calyx ½ line long; with a short tube and 5 deltoid segments. Corolla three times as long as the calyx, with a short tube and 5 spreading segments hairy inside. Style clavate, nearly as long as the corolla. Fruit not seen.

Hab. Common on the mountains of Ovalau, *Horne* 227!

PLECTRONIA MACCONNELI (*Horne, 'A Year in Fiji,'* p. 266) proves, on dissection, to be the well-known *Pisonia inermis* of Forster, of which a full account will be found in Seemann's 'Flora Vitiensis,' p. 195.

IXORA JOSKEI (*Horne, 'A Year in Fiji,'* p. 263).

Fruticosa, glabra, stipulis minutis, foliis petiolatis oblongo-lanceolatis, acutis, floribus in corymbos paucifloros laxos axillares dispositis, pedicellis flori æquilongis, calycis tubo campanulato, dentibus 5 minutis, corollæ tubo cylindrico quam calyx duplo longiore, limbi segmentis 5 lanceolatis quam tubus triplo longioribus, antheris ad tubi faucem sessilibus quam segmenta brevioribus.

A small tree, glabrous in all its parts. Petiole ½–¾ in. long; blade oblong-lanceolate, acute, narrowed to the base, 4–5 in. long, 1–1½ in. broad at the middle, moderately firm in texture, green on both surfaces, with 8–9 pairs of ascending alternate main veins distinct nearly to the edge. Flowers in axillary corymbs, which are much shorter than the leaves; pedicels slender, ½ in. long. Calyx campanulate, 1 line long and broad, free in the upper half, with 5 minute teeth. Corolla ½ in. long, with a short cylindrical tube and 5 much contorted lanceolate segments ⅓ in. long. Anthers 5, subsessile at the throat of the corolla-tube, ⅛ in. long.

Hab. Navisi, Said-mills, Viti Levu, *Horne* 731!

IXORA CAREWI (*Horne, 'A Year in Fiji,'* p. 263).

Fruticosa, glabra, stipulis magnis deltoideis, foliis maximis subsessilibus oblongis acutis, floribus in paniculas deltoideas axillares ramis multifloris dense corymbosis aggregatis, pedicellis brevissimis, calycis tubo campanulato, dentibus 4 minutis deltoideis, corollæ carneæ segmentis 4 lingulatis, tubo cylindrico æquilongis, antheris subsessilibus corollæ limbo æquilongis.

A shrub, about 8 feet in height, glabrous in all its parts. Stipules large, deltoid-cuspidate. Leaves oblong, subsessile, acute, narrowed to the base, above a foot long, 4–5 inches broad at the middle, moderately firm in texture, green on both surfaces, with distant ascending main veins which are distinct nearly to the margin. Flowers in deltoid sessile axillary panicles 3–4 in. long and broad, with dense corymbs at the end of the branches; pedicels very short. Calyx with a campanulate glabrous coriaceous tube, under a line in length and breadth, and 4 minute deltoid teeth. Corolla flesh-coloured, ½ in. long, with 4 lingulate segments about equalling in length the cylindrical tube. Anthers 4, subsessile at throat of the corolla-tube, about the same length as the segments.

Hab. Damp forests in the interior of Viti Levu, at a place called Babuca, *Horne*, 985!

CALYCOSIA HUNTERI (*Horne, 'A Year in Fiji,'* p. 258.)

Fruticosa, glabra, stipulis minutis, foliis petiolatis oblongis subobtusis basi deltoideis, floribus in paniculas parvas terminales sessiles ramis paucifloris umbellatis dispositis, ovario biloculari, calycis limbo campanulato, ore obscure dentato, corollæ albæ tubo cylindrico, segmentis 5 lingulatis quam tubus triplo brevioribus.

A shrub 10–12 feet high, glabrous in all its parts. Leaves crowded, distinctly petioled, 2–3 in. long, moderately firm in texture, green on both surfaces, with ascending main veins distinct from midrib to margin $\frac{1}{4}$–$\frac{1}{3}$ in. apart. Flowers in lax sessile terminal panicles about as long as the leaves, shortly pedicellate in sparse umbellate cymes at the end of the branches. Ovary globose, 2-celled; calyx-limb campanulate, $\frac{1}{6}$ in. long and broad, obscurely 5-toothed. Corolla white, fragrant, with a cylindrical tube about an inch long, and five lingulate segments, $\frac{1}{3}$ in. long. Anthers 5, lanceolate, $\frac{1}{12}$ in. long, sessile at the glabrous throat of the corolla-tube. Style protruded $\frac{1}{2}$ in. from the calyx, with two short subulate stigmatose branches. Fruit not seen.

Hab. Island of Taviuni, in shady forests, *Horne* 1137. Named after the proprietor of the estate on which it was found.

HYDNOPHYTUM WILKINSONI (*Horne*, '*A Year in Fiji*,' p. 263).

Fruticosum, glabrum, caule basi tuberoso formicibus excavato, ramulis tetragonis, stipulis minutis, foliis parvis obovato-oblongis obtusis brevissime petiolatis, floribus ad axillas foliorum fasciculatis subsessilibus, ovario campanulato biloculari, calycis limbo parvo campanulato obscure dentato, fructu subdeltoideo compresso, pyrenis 2 osseis oblongis.

An epiphytic shrub, glabrous in all its parts, with the base of the stem dilated into a large tuber and used as a nest by small black ants, the branchlets slender and distinctly 4-angled. Leaves nearly sessile, thick and rather fleshy in texture, obtuse, cuneate at the base, $\frac{3}{4}$ to 1 in. long. Flowers in copious sessile fascicles in the axils of the leaves. Ovary campanulate. Calyx-limb collar-like, with 5 very minute teeth. Corolla only seen in the bud stage. Fruit subdeltoid, $\frac{1}{6}$ in. long and broad, containing 2 oblong bony one-seeded pyrenes, which only just touch one another, and are not at all flattened at the point of contact, but quite orbicular in transverse section, so that the fruit is twice as thick in one diameter as the other.

Hab. Forests of Bua, Vanua Levu, *Horne* 1077!

HYDNOPHYTUM? WILSONI (*Horne*, '*A Year in Fiji*,' p. 263).

Fruticosum, ramulis scabris subtetragonis, stipulis minutis, foliis petiolatis oblanceolato-oblongis acutis basi attenuatis, floribus axillaribus sessilibus fasciculatis, ovario globoso 4-loculari, calycis limbo campanulato subintegro, corollæ segmentis 4 oblongo-lanceolatis quam tubus longioribus, fructu globoso haud compresso, pyrenis 4 lateribus interioribus angulatis.

A shrub, with shorter branchlets than in *H. Wilkinsoni*, with a wrinkled and rugose brown epidermis. Leaves distinctly petioled, 3–4 in. long, 1–$1\frac{1}{2}$ in. broad, narrowed gradually to the base and apex, subcoriaceous, green and glabrous on both surfaces, the main veins fine and inconspicuous. Flowers in copious glomerate sessile axillary fascicles. Calyx-limb campanulate, coriaceous, truncate, $\frac{1}{8}$ in. long and broad. Corolla $\frac{1}{4}$ in. long, with a campanulate tube and. 4 oblong-lanceolate segments. Fruit a globose berry $\frac{1}{6}$ in. long. and broad, with four bony one-seeded tightly packed pyrenes, filling up the whole of it inside the epidermis.

Hab. Wooded mountains of Taviuni, near the coffee-estate of Forest Creek, *Horne* 1139.

This recedes from the typical species of *Hydnophytum* by its four-celled ovary; and Mr. Horne's note on the sheet does not say any thing about the stem being tuberous and excavated by ants, as in the other species.

The following species was examined and characterized by Mr. W. P. Hiern, the monographer of the order to which it belongs.

MABA LATERIFLORA (*Horne*, '*A Year in Fiji*,' p. 264).

Arborea, ramulis glabris, foliis breviter petiolatis oblongis obtusis coriaceis glabris, floribus lateralibus contiguis distichis subsessilibus, calycis pilosi campanulato lobis parvis deltoideis, corollæ pilosæ segmentis brevibus ovatis, masculis staminibus 6 glabris, ovario rudimentario piloso, fœmineis staminodiis nullis, ovario triloculari, ovulis in loculo geminis, fructu magno ellipsoideo obtuso piloso.—Maba (Ferreola) lateriflora, *Hiern in Herb. Kew.* 1879.

A small diœcious tree, 16–20 feet high; branches alternate, terete, black-ashy, glabrate except the puberulous extremities. Leaves alternate, distichous, oval, obtusely narrowly or nearly rounded at both ends, glabrous, thinly coriaceous, brown-green (in the dry state), rather paler beneath, opaque, $2\frac{3}{4}$–$5\frac{1}{2}$ in. long by 1–$2\frac{1}{4}$ in. wide; petiole $\frac{1}{8}$–$\frac{1}{4}$ in. long.

Male flowers lateral and axillary, clustered in 2 or more rows, white; calyx shortly 3-lobed, nearly $\frac{1}{4}$ in. long (in the dry state) by $\frac{1}{8}$ in. thick; corolla 3-cleft, hairy outside, glabrous inside; stamens 6, glabrous; ovary rudimentary, hairy.

Female flowers lateral in 2 opposite rows on the branches of $\frac{1}{7}$–$\frac{1}{9}$ in. diam., solitary but approximate, subsessile; peduncles very short, with small imbricated bracts at the base, pubescent; flower-buds nearly $\frac{1}{2}$ in. long; calyx cup-shaped, shortly 3-cleft, silky-tomentose, $\frac{1}{4}$ in. long, with roundly deltoid not imbricated lobes; corolla shortly 3-lobed, urceolate, pale tawny, silky outside, inside glabrous or nearly so; staminodes none; ovary densely silky-hairy, 3-celled; ovules 2 in each cell.

Fruits solitary, lateral, in 2 opposite rows or axillary, ellipsoidal, obtuse, rather umbilicate at the apex, 1¼ in. long, by apparently about 1 in. thick, with scattered hairs, about 4-seeded, 3-celled; fruiting calyx shallow-cupshaped, ½ in. diam., hairy outside, with 3 (or perhaps more) vague rounded lobes; seeds 2, together or solitary, in the cells of the fruit, about 1 in. long; albumen apparently uniform.

Hab. Fiji Islands; apparently not uncommon, in mountainous situations, in woods. Lavoni valley, January 1878, *Horne* No. 201 (male plant in flower); Rabi, March 1878, *Horne*, without number (female plant in flower); Viti Levu, mountains of Navosa, *Horne* No. 1013 (female plant in fruit).

No. 823 of the same collection, "in the forests near Naquare on the Navua river, Viti Levu, June 1878," with smaller and perhaps younger fruits and with highly verrucose branchlets, may possibly belong to the same species.

DICHOPSIS HORNEI (*Hartog, MS. in Herb. Kew.* 1879).

Arborea, glabra, ramulis validis nodulosis, foliis confertis petiolatis oblanceolato-oblongis obtusis coriaceis, floribus fasciculatis axillaribus longe pedicellatis, calycis segmentis tubo æquilongis, exterioribus ovatis rigidis glabris, interioribus tenuioribus pilosis, corollæ tubo brevi, segmentis oblongis obtusis, antheris lanceolatis apiculatis filamentis brevibus inæquilongis.

A tree about 50 feet in height, with a trunk 2 feet in diameter. Branchlets stout, glabrous, with raised nodes from which spring the clusters of flowers. Leaves crowded at the end of the branchlets, distinctly petioled, oblanceolate-oblong, obtuse, 3–4 in. long, 1–1½ in. broad, narrowed gradually from the middle to the base, very coriaceous, green and glabrous on both surfaces, the arching main veins parallel from midrib to margin about ½ in. apart. Flowers in numerous crowded axillary fascicles on arching glabrous peduncles about an inch long. Calyx campanulate, coriaceous, ⅙ in. long, the three outer segments ovate, obtuse, valvate, rather longer than the tube, very rigid in texture, the three inner thinner in texture and pilose on the back. Corolla seen in the bud-stage only, glabrous, with 6 oblong much imbricated segments and a short campanulate tube. Stamens inserted in two rows at the throat of the corolla-tube; anthers lanceolate, glabrous, apiculate, unequal in size; filaments short, flattened, unequal in length. Ovary ovoid, narrowed into the subulate style.

Hab. Common in the forests of Navesi Suva, Viti Levu, *Horne* 717. "Timber good."

PAYENA HILLII (*Horne*, '*A Year in Fiji*,' p. 266).

Arborea, ramulis gracillimis glabris, foliis breviter petiolatis oblongis coriaceis utrinque glabris, floribus paucis axillaribus fasciculatis longe pedicellatis, calycis tubo brevi campanulato, segmentis exterioribus ovatis coriaceis pilosis, interioribus tenuioribus oblongis præter carinam glabris, corollæ tubo campanulato fauce piloso, segmentis oblanceolatis quam tubus duplo longioribus, antheris sessilibus pilosis, stylo exserto.

A tree, 40 feet in height, with dark brown bark. Branchlets very slender, glabrous. Leaves shortly petioled, 2–4 in. long, 1–2 in. broad at the middle, subacute, deltoid at the base, green and glabrous on both surfaces, the fine erecto-patent main veins distinct nearly to the margin. Flowers in sparse axillary fascicles on slender curved spreading peduncles above $\frac{1}{2}$ in. long. Calyx campanulate, pilose, $\frac{1}{8}$ in. long and broad, the two outer segments nearly valvate, rigid in texture, the two inner ones thinner more oblong and pilose only on the keel. Corolla twice as long as the calyx, with a short tube and 8 oblanceolate obtuse dark purplish-brown segments. Anthers sessile at the throat of the corolla-tube, densely pilose, less than half as long as the segments. Ovary globose; style filiform, protruded beyond the corolla.

Hab. Island of Rabi, Fiji, *Horne* 484.

TABERNÆMONTANA THURSTONI (*Horne*, '*A Year in Fiji*,' p. 268).

Arborea, glabra, foliis petiolatis oblongis magnis subcoriaceis, cymis axillaribus paucifloris quam folia duplo brevioribus, pedicellis elongatis, calycis pilosi tubo campanulato, segmentis semiorbicularibus, folliculis patulis glabris inæquilateraliter ovoideis.

A tree, 30 feet in height, with a rounded head, dark green foliage, and white flowers. Branchlets moderately stout, glabrous. Leaves shortly petioled, oblong, 4–6 in. long, $1\frac{1}{2}$–2 in. broad at the middle, subobtuse, deltoid at the base, subcoriaceous, green on both surfaces, the arching ascending main veins distinct from the midrib to the margin, about in. apart. Cymes few-flowered, peduncled, about as long as the leaves; pedicels ascending, ½–1 in. or more long. Calyx ⅙ in. long and broad, with a campanulate tube and 5 semiorbicular segments. Corolla not present in the specimens. Follicles oblique ovoid, glabrous, spreading horizontally, ½ in. long, and ⅓ in. diam.

Hab. "Common in rich damp soil on waste land, as well as in the forests throughout Fiji. When wounded a thin milk-white juice exudes, which yields a small quantity of caoutchouc." *Horne* 268. Named after the gentleman who held the post of Secretary to the colony at the time of Mr. Horne's visit.

HOYA BARRACKI (*Horne* '*A Year in Fiji*,' p. 262, name only) is evidently identical with *H. bicarinata*, A. Gray, in Proc. Amer. Acad. v. 335, which is considered by Mr. Bentham (Flor. Austral. iv. 346) conspecific with *H. australis*, R. Br.

SOLANUM SEEDII (*Horne*, '*A Year in Fiji*,' p. 268).

Fruticosum, pilis hispidis patulis brunneis gracilibus dense vestitum, ramulis validis inermibus, foliis longe petiolatis oblongis magnis repandis, cymis sessilibus paucifloris, pedicellis brevibus, calycis tubo brevi, segmentis deltoideis, fructibus magnis globosis dense pilosis.

A shrub, about 4 feet high, with stout unprickly stems, densely clothed, as are the leaves, pedicels, calyces, and berries, with short spreading fine brown bristly hairs. Petiole 2–3 in. long; blade oblong, repand, 4–6 in. long, densely clothed with stronger and more bristly hairs on the upper surface, and finer and softer pubescence beneath. Cymes lateral, sessile, few-flowered. Pedicels densely pilose, about ½ in. long. Calyx ¼–⅓ in. diam., densely pilose, with a short campanulate tube and 5 deltoid teeth. Corolla and stamens not present in the specimen. Berry large, globose, densely pilose.

Hab. Waste places, Tai Levu, Viti Levu, *Horne* 332. A near ally of *S. repandum*, Forst., figured at tab. 38 of Seemann's 'Flora Vitiensis.'

CLERODENDRON LEHUNTEI (*Horne*, '*A Year in Fiji*,' p. 259).

Fruticosum, scandens, foliis petiolatis obovatis obtusis subcoriaceis glabris, floribus perpluribus in paniculam corymbosam terminalem aggregatis, pedunculis pedicellisque incanis, calycis incani tubo campanulato, segmentis late ovatis obtusis, corollæ albidæ late infundibularis erectæ, segmentis subæqualibus ovatis obtusis, staminibus styloque longe exsertis.

A climbing shrub, with glabrous branchlets. Leaves distinctly petioled, obovate, obtuse, deltoid at the base, 3–4 in. long, 2–2½ in.

broad, subcoriaceous, green and glabrous on both surfaces. Flowers very numerous, aggregated in dense corymbose terminal panicles, with pubescent angled peduncles; pedicels erect, downy, $\frac{1}{4}$–$\frac{1}{2}$ in. long. Calyx $\frac{1}{6}$ in. long, $\frac{1}{4}$ in. broad, downy, coriaceous, with a short campanulate tube and 4 subequal ovate obtuse segments longer than the tube. Corolla white, erect, $\frac{1}{2}$ in. long, with a funnel-shaped tube $\frac{1}{8}$ in. diam. at the middle, and 4 subequal ovate obtuse segments $\frac{1}{8}$–$\frac{1}{6}$ in. long. Stamens subequal, inserted at the throat of the corolla-tube; filaments glabrous, about $\frac{3}{4}$ in. long; anthers oblong, $\frac{1}{6}$ in. long, versatile. Style protruding beyond the anthers. Fruit not seen.

Hab. Climbing on Shaddock trees at Waidrada, near Nadrau, in the interior of Vitu Levu, *Horne* 1002! Mr. Le Hunte is Government Commissioner for a portion of the interior of Vitu Levu, and gave Mr. Horne much assistance in gathering specimens.

CLERODENDRON GORDONI (" Arthur-Gordoni," *Horne*, '*A Year in Fiji*,' p. 258).

Fruticosum, scandens, foliis petiolatis obovato-oblongis obtusis subcoriaceis glabris, floribus in paniculam densam corymbosam terminalem aggregatis, pedunculis pedicellisque incanis, calycis segmentis late ovatis obtusis vel cuspidatis tubo campanulato æquilongis, corollæ albæ tubo elongato cylindrico, segmentis parvis oblongis, staminibus breviter exsertis.

A climbing shrub, with moderately stout glabrous branchlets. Leaves distinctly petioled, 4–6 in. long, 2–2$\frac{1}{2}$ in. broad, narrowed gradually from the middle to the base, subcoriaceous, green and glabrous on both surfaces, the arching ascending main veins distinct to the margin, about $\frac{1}{2}$ in. apart. Flowers numerous, aggregated in dense corymbose terminal panicles with pubescent peduncles and short pedicels. Calyx campanulate, coriaceous, glabrous, $\frac{1}{4}$–$\frac{1}{3}$ in. long and broad, with 4 ovate obtuse or cuspidate segments as long as the tube. Corolla white, with a cylindrical tube an inch long and 4 small oblong segments. Stamens just exserted; filaments not more than $\frac{1}{4}$ in. long; anthers oblong, $\frac{1}{8}$ in. long. Fruit not seen.

Hab. Not uncommon in many parts of Viti Levu, *Horne* (without number). Named after Mr. A. H. Gordon, Private Secretary to Sir Arthur Gordon, Mr. Horne's companion on many excursions both in the Seychelles and Fiji.

MACARANGA MAUDSLAYI (*Horne, 'A Year in Fiji,'* p. 264).

Of this there is neither flower nor fruit, so that the generic position of the plant is uncertain.

CELTIS HARPERI (*Horne, 'A Year in Fiji,'* p. 259).

Arborescens, glabra, foliis petiolatis oblongis acutis coriaceis basi deltoideis dimidio inferiore triplinerviis, floribus masculis in cymas laxifloras paucifloras pedunculatas dispositis, perianthii segmentis orbicularibus, staminibus inclusis, filamento brevissimo applanato, antheris oblongis, pistillo rudimentario.

A large shrub, with slender terete branchlets, quite glabrous in all its parts. Leaves shortly petioled, oblong, 3–4 in. long, $1\frac{1}{2}$–2 in. broad, acute, deltoid at the base, coriaceous, green and glabrous on both surfaces, triplinerved in the lower half. Male flowers in lax peduncled axillary cymes under an inch long, both peduncle and pedicels quite glabrous. Male perianth campanulate, $\frac{1}{6}$ in. diam., $\frac{1}{12}$ in. long, with 5 orbicular segments. Stamens included; anthers oblong; filament very short, lanceolate. Pistil rudimentary. Female flower and fruit unknown.

Hab. Mountain-forests between Wai Wai and Lomaloma, Vanua Levu, *Horne*!

FICUS (§UROSTIGMA) MASONI (*Horne, 'A Year in Fiji,'* p. 262).

Arborea, ramulis scabris, foliis brevissime petiolatis magnis oblique oblongis acutis latere inferiori dilatato basi cordato utrinque viridibus glabris, receptaculis parvis globosis glabris breviter pedicellatis ad ramorum partem inferiorem defoliatam productis.

A small tree, with slender terete branchlets, scabrous with minute papillæ. Leaves with a very short incrassated petiole and inæquilateral oblong acute blade, reaching a foot in length, 3–4 in. broad, cut away towards the base on the upper, and much dilated and broadly cordate on the lower side of the midrib, thin in texture, green and glabrous on both surfaces. Receptacles in clusters from the lower part of the branches below the leaves, globose, glabrous, $\frac{1}{6}$ in. diam., shortly pedicellate.

Hab. A small tree, not uncommon in the mountain-forests of Ovalau, at about 1000 feet above sea-level, *Horne* 55! Mr. Mason is the President of the Fiji Chamber of Agriculture.

FICUS CAVEI (*Horne, 'A Year in Fiji,'* p. 262) is probably conspecific with *F. Storckii*, Seem. Fl. Vit. p. 251, tab. 69. Mr. Horne gathered it in the mountain-forests of the island of Rabi, and describes it as a tree 40 feet high, with receptacles half an inch in diameter and yellow when ripe.

FICUS (§ UROSTIGMA) SMITHII (*Horne, 'A Year in Fiji,'* p. 262).

Arborea, glabra, ramulis gracilibus, stipulis parvis lanceolatis acuminatis, foliis petiolatis oblanceolato-oblongis subobtusis subcoriaceis subtus pallidis, receptaculis geminis parvis globosis glabris axillaribus pedicellatis.

A small tree, glabrous in all its parts, with very slender brown branchlets. Stipules lanceolate, acuminate, scariose, $\frac{1}{4}$–$\frac{1}{3}$ in. long. Petiole about $\frac{1}{2}$ in. long; blade 3–4 in. long, 1–1$\frac{1}{2}$ in. broad, subobtuse, narrowed gradually from the middle to the base, subcoriaceous, very pale beneath, the spreading main veins connected by distinct intramarginal arches. Receptacles in pairs in the axils of the leaves, globose, glabrous, $\frac{1}{6}$ in. diam., on spreading slender peduncles $\frac{1}{4}$–$\frac{1}{3}$ in. long.

Hab. Mountain-forests of the island of Rabi, *Horne* 516! Named after J. C. Smith, Esq., Member of the Council of Government, Fiji. Of the species described in Seemann's 'Flora' this comes nearest to *F. bambusæfolia*, p. 250, tab. 67.

The two following Orchids were examined and characterized in manuscript in 1879 by Mr. Spencer Le Marchant Moore, F.L.S.:—

DENDROBIUM (§ DENDROCORYNE) GORDONI (*Horne, 'A Year in Fiji,'* p. 260).

D. Veitchiano simillimum, pseudobulbo oblongo utrinque angustato longe stipitato longitudinaliter sulcato nitido, foliis geminis coriaceis ovato-oblongis apice inæqualiter ac minute bidentatis præcipue subtus nervosis ac secus nervum centralem carinulatis, spica circiter 4-flora quam folia longiore sparsim squamifera, bracteis ovatis acuminatis glabris quam anthophorum dimidio brevioribus, anthophoro villoso sub flore dilatato, floribus magnis, sepalis ovato-lanceolatis acuminatis extus villosis intus glabris, petalis spathulatis acutatis glabris tenuibus quam sepala paulo brevioribus, labello rotundato breviter trilobo glabro, lobis lateralibus late ovatis erectis in unguem subito desinentibus, lobo mediano eximie cuspidato, callo e basi lata dentata in carinas tres æquialtas elevatas truncatas abeunte, mento conspicuo cum anthophoro angulum rectum formante obtuso sepalis lateralibus connatis obtecto, columna brevi utrinque breviter ac late dentata, fovea stigmatica eximie excavata.

Pseudobulbus ad 19 cm., medio ad 2 cm. crassus; ejus stipes 0·2 cm. crassus sparsim squamosus. Folia 9–14 cm. longa ad 5 cm. lata. Bracteæ ad 1·9 cm. longæ, leviter amplexicaules. Anthophorum 3·5 cm. longum.

Sepala 2·5 cm. et mentum 1·3 cm. longum. Flores pallide virescentes, labello rubro punctato.

This is a very near ally of *D. Veitchianum*, Lindl., which on account of its small leaves, broader sepals, obtuse petals, and very broad mid-lobe of labellum, I venture to think distinct from *D. macrophyllum*, Rich. *D. Gordoni* seems intermediate between the two, having much of the vegetative character of *Veitchianum*, with the acuminate sepals and petals of *macrophyllum*; from this latter also its much less deeply 3-lobed and apparently smaller labellum is an excellent distinguishing feature. What the shape of the callus in *macrophyllum* is I do not know, that species not being represented in the Kew Collection; I have, however, compared the callus of our labellum with that of *Veitchianum*, which latter stands up abruptly as a 3-lobed tooth, and is entirely different from the equally horizontally 3-keeled callus of *Gordoni*.

Hab. Samoa, in a large swamp at about 1500 feet above the sea-level in Upolu on Pandani, also in Viti Levu, on Dammara trees at Babuca, *Horne* 942!

DENDROBIUM (§ EUDENDROBIUM) HORNEI (*Horne*, '*A Year in Fiji*,' p. 260).

D. caule basi breviter pseudobulboso-dilatato ibidemque radices validas copiose emittente, superne mox attenuato, foliis lanceolato-oblongis obtusissimis siccitate crebre nervosis 7–10 cm. longis, spicis elongatis compressis sparsissime squamigeris apice paucifloris, bracteis parvis ovatis carinulatis, anthophorum gracile glabrum, floribus mediocribus, sepalis ac petalis similibus (petalis vero paullo minoribus) lineari-lanceolatis acuminatis, labello quam perianthii segmenta paullo breviore ovato-oblongo circiter ad medium 2-carinato 3-lobo, lobis lateralibus abbreviatis, lobo mediano late ovato margine undulato, mento acutiusculo cum anthophoro angulum circiter 45° formante, columna utrinque dentata, fovea stigmatica ovata.

Caulis ex sicco circiter 0·6–0·7 cm. crassus. Spica ultra 20·0 cm. et anthophorum circiter 10·5 cm. longum. Sepala 2·3 cm. et mentum 0·5 cm. longitudine.

This species apparently comes nearest *D. Tokai*, Reichb. f., from which it is, however, abundantly distinct.

Hab. Island of Rabi, Fiji, on trees on the shore, *Horne*!

On *Hemicarex*, Benth., and its Allies.

By C. B. Clarke, F.R.S., F.L.S.

[Read April 5, 1883.]

The separation of *Kobresia*, *Uncinia*, and *Schœnoxiphium* from *Carex* generically was easy, so long as a few species only of these smaller genera were known. *Kobresia* had the glume of the female flower concave, open or with the margins slightly connected near the base; *Carex* had a complete utricle. But in the considerable number of species now known of *Kobresia* (including *Hemicarex*, Benth.), this character is found to become illusory by degrees: the margins of the glume are exceedingly thin and brought close together; whether they are actually connate for more or less than half the length of the glume appears a matter of very slight importance to establish a genus upon, and from the exceeding fragility of the scarious margins it is exceedingly difficult to determine; different female flowers from the same plant, treated with every care under water, give different results.

The genus *Uncinia* was separated from *Carex* by the presence of a long seta within the female glume, usually exserted from it and hooked at the top. But in *Carex microglochin* there is a similar seta exserted from the female glume, and more distinctly hooked than in species placed by all authors in *Uncinia*. For comparison, I have arranged it here, as Sprengel did, under *Uncinia*, though Mr. Bentham has retained it in *Carex*. I feel sure that, had *C. microglochin* been found in the southern hemisphere instead of in the northern, authors would have placed it without hesitation in *Uncinia*. There are, in short, one or two species intermediate between *Carex* and *Uncinia*, and which may be placed according to taste in either: this is no reason, when we have a well-marked genus of more than 500 species like *Carex*, that we should destroy its homogeneous character by loading it with another group (*Uncinia*) well-marked on the whole and long established: it would be a very good reason, had *Uncinia* never yet been separated from *Carex*, against making the species of *Uncinia* into a new genus.

Our old land-marks thus failing us, Eichler, Bœckeler, Bentham, &c. have relied more on the inflorescence and on the number of times the floral axis is divided for the demarcation of genera.

The "complete spikelet" in *Kobresia* and the allied genera is androgynous, consisting of one female flower at base and 1–4 or more male flowers above it (*cf.* Nees, Genera Monocot. 2, *Elyna spicata*). Towards the summit of the inflorescence the spikelets have a tendency to become male, *i. e.* the female flower at the base is obsolete; towards the base of the inflorescence the male portion of the spikelet is reduced, often to a rudiment or obsolete, the female spikelets are arranged in compound spikes. The three cases of 1-flowered female spikelets, complete androgynous spikelets, many-flowered male spikelets, may occur in one inflorescence. I fear that, in some of the characters taken from inflorescence, laid down as absolutely generic by authors, the *whole* inflorescence in a well-developed plant has not been sufficiently examined.

In the inflorescence of *Carex pulicaris* we consider the terminal male flowers as forming one spikelet, each of the female utricles we consider a spikelet. This we may call an androgynous simple solitary spike, and it represents exactly the inflorescence of the simple-spiked section of *Hemicarex*.

In the inflorescence of *Carex sylvatica* we have the lower spikes of many female 1-flowered spikelets, the spike being not rarely terminated by a single many-flowered spikelet; the uppermost spikes are usually wholly male of one very numerous-flowered spikelet, though it is not rare to find a terminal spike with some female 1-flowered spikelets at its base. This represents exactly the inflorescence of the compound-spiked section of *Hemicarex*.

Kobresia differs in that the spikelets are either complete, *i. e.* androgynous with one female flower, *or* in spikes of several female spikelets without males. But occasionally we find androgynous spikes with two females at the base; these we consider to consist of one complete androgynous, and one female, spikelet, and they are technically *Hemicarex*. Mr. Bentham has placed *Kobresia pseudo-laxa* in a different genus from *Hemicarex* (olim *Kobresia*) *laxa*; but, in the field, I always supposed this species (as are many others) somewhat dimorphic, the male flowers predominating in one form, the female in another; and I supposed *Kobresia pseudo-laxa* the male, *Hemicarex laxa* the female form of the same thing, a view which Mr. Bentham will not hear of. I hope to have opportunity in N. Kashmir or the Karakorum for coming to a decided opinion on this important point.

In *Kobresia* and *Hemicarex,* in the androgynous spikelet the male portion is quite sessile, *i. e.* there is no lengthening of the axis between the lowest male and uppermost female; though in many female flowers with a rudiment, this rudiment takes the form of an elongate flattened rhachilla. But in the androgynous complete spikelet of *Schœnoxiphium* the rhachilla, between the female and the lowest male flower, is elongated, often nearly to the length of the female glume, flattened, scarious-winged, ciliate, with two green nerves its whole length. This occurs in every species which I have referred to *Schœnoxiphium*. Mr. Bentham has sorted all the *Schœnoxiphiums* into *Hemicarex*, except the original type of the genus, *S. rufum*, Nees. In this the wing of the dilated rhachilla has two minute serrate processes near its apex, but otherwise the wing of *S. Thunbergii*, *Burkei*, &c. is exactly similar. The arrangement of the *Kobresiæ* in genera is a difficult matter on which I criticize Mr. Bentham with the greatest hesitation; but I am strongly of opinion that if *Schœnoxiphium rufum* is separated generically from *Kobresia* and *Hemicarex laxa*, then all the *Cape* species must be made congeneric with *Schœnoxiphium rufum*.

Uncinia differs from the preceding genera in the completeness of the utricle, and is only separated from *Carex* by an artificial line. In *Carex uncinioides*, Boott (Ill. Carex, t. 23), the rudiment within the utricle is generally as Boott represents; but in some of my specimens the "rudiment" consists of a rhachilla about half as long as the glume, carrying an imperfect male spikelet of one or two glumes.

Kobresia, *Willd. Sp. Pl.* iv. p. 205; *Benth. et Hook. f. Gen. Pl.* iii. p. 1071.—Caricis sp., *Allioni, Fl. Pedem.* ii. pp. 264, 265.

Flores unisexuales. Spiculæ androgynæ (flos imus fœmineus, superiores 1–6 masculi), aut fœmineæ, 1-floræ, floribus masculis obsoletis aut ad rudimentum reductis; rhachilla inter florem fœmineum et masculum imum brevissima, non alata. Gluma fœminea concava, marginibus basi vel usque ad medium connatis; glumæ masculæ obscurius subdistichæ.

Perennes, radicibus lente fibrosis, glabræ (marginibus glumarum perraro minutissime pubescentibus). Culmi cæspitosi, fasciculati, læves vel minute scabri. Folia prope basin culmi plura, anguste linearia, in marginibus (saltem prope apices) scabrida; vaginæ imæ aphyllæ aut subaphyllæ, testaceæ. Bracteæ ovatæ, obtusæ aut aristatæ, interdum breviter foliiformes. Spica terminalis oblonga, densa aut parcius breviter ramosa.

Sect. *a*. SIMPLICES. Spiculæ in spica simplice sessiles. (Bractea ima rarissime elongata.)

* *Spicarum bracteæ imæ erectæ, circa rhachin astrictæ.*

1. K. SCIRPINA (*Willd. Sp. Pl.* iv. p. 205): culmis tenuibus; foliis canaliculato-complicatis; bracteis ovatis subobtusis, imis parum distantibus; nuce obovato-oblonga, stylobasi lineari.—*Svensk. Bot.* viii. tab. 527. fig. 1; *Hornem. in Fl. Dan.* t. 1529, saltem quoad descript. (tab. ipsa autem exclud. ?); *Wahl. Fl. Suec.* (1833) ii. p. 605; *Bœck. in Linnæa*, xxxix. p. 6.—K. Bellardi, *Loisel, Fl. Gall.* (1828) ii. p. 281.—K. filiformis, *Dewey in Sillim. Amer. Journ.* ser. 1, xxix. p. 253, tab. Z. fig. 85.—Cobresia scirpina, *Pers. Syn.* ii. 534; *Anderss. Cyper. Scand.* 14.—Carex Bellardi, *Allion. Fl. Pedem.* ii. p. 264, t. 92. fig. 2; *Host. Gram.* iv. 43. t. 77; *Schkuhr, Carex*, i. p. 13, tab. D. fig. 16.—C. myosuroides, *Vill. Pl. Dauph.* ii. 194, t. 6, *nec Gmel.*, *nec Lowe.*—C. dioica, var. β, *Lam. Encycl.* iii. p. 378, *non Linn.*—C. hermaphrodita, *Gmel. Syst. Veg.* p. 139, *non Jacq.*—C. lucida, *Linn. Herb. neque Boott neque aliorum.*—Elyna spicata, *Schrad. Fl. Germ.* i. p. 155; *Reich. Cyper. Fl. Germ.* p. 2, tab. 193; *Sturm, Deutsch. Fl.* viii.; *Nees, Gen.* ii., cum tab.; *Torrey in Ann. Lyceum New York*, iii. p. 385.—E. Bellardi, *Hartman in Kong. Akad. Handl. Stockholm* (1818) p. 154.—Scirpus Bellardi, *Wahl. Fl. Lapp.* 15.—Frœlichia caricoides, *Fenzl et Graf. Fl. Norica*, p. 729.

Culmi $\frac{1}{2}$–2 dm. Folia cum culmis subæquilonga. Spicæ longæ 2–3 cm., latæ 2–5 mm. Bracteæ longæ 3 mm. (ima vix acuta neque aristata), omnes vel plurimæ imbricatæ, in rhachi astrictæ, ferrugineæ aut castaneæ, læves. Spiculæ imæ et evolutiores 3–4-floræ, flore imo (perraro 2 imis) fœmineis, floribus 1–3 superioribus masculis aut summo rudimentario; spiculæ intermediæ 2-floræ, flore inferiore fœmineo, superiore masculo aut sterili aut rudimentario; flores summi masculi. (Spiculæ autem fœmineæ 1-floræ sine rudimento haud raro obviæ sunt.) Floris fœminei gluma bracteæ similis sed minor, lævis, marginibus basi haud aut breviter connatis, in spiculis 2–1-floris florem superiorem masculum includens subutriculiformis, in spiculis 3–4-floris minus involuta, aut aperta dorso leviter concavo; stylus basi linearis. Nux longa 2 mill., obovato-oblonga, in basim linearem styli subito angustata, obscurius reticulata.

Regiones arcticæ hemisphærii borealis, in Europa, Asia, America frequens; in Islandia et Grœnlandia. In alpinis regionis temperatæ hemisphærii borealis, usque ad Dahuriam, Mont. Alpes, Pyrenees ; Rocky Mts. (America).

2. K. CAPILLIFOLIA : culmis tenuibus ; foliis canaliculato-complicatis ; bracteis ovatis subobtusis imbricatis ; nuce obovato-lanceolata, stylobasi conica.—Elyna capillifolia, *Decaisne! in Jacquem. Voy. Ind.* p. 173, tab. 174, *non Henderson.*—Elyna, sp. 6, *Herb. Ind. Or. Hook. f. et T. Thoms.*

Culmi 1–4 dm. Folia culmis paullo breviora. Spicæ longæ 2–3 cm., latæ 4–6 mm. Bracteæ longæ 5 mm. (ima vix acuta neque aristata), in rhachi astrictæ, castaneæ aut nigrescentes. Spiculæ pro maxima parte 3–4-floræ ; flos imus (raro 2 imi) fœmineus, superiores masculi, vix distichi. Floris fœminei gluma bracteæ similis sed minor, lævis rarius obscure serrulata, marginibus basi breviter connatis ; stylus basi conico-incrassatus. Nux longa 4 mill., in basim conicam styli sensim angustata, sublaxe distinctius reticulata.—*K. scirpinæ* affinis, differt imprimis spiculis plurifloris, glumis nucibusque majoribus, stylo basi incrassato.—Elyna capillifolia, *Henderson, Yarkand*, p. 339. n. 371, est Carex stenophylla, *Wahl.*

Himalaya occidentalis ; Kunawur (*Jacquemont*, n. 1598) ; Zanskar (*T. Thomson*) ; Rongdu (*Winterbottom*, n. 790) ; Kashmir, alt. 3000–3500 metr., Pir Pinjul (*C. B. Clarke*, nn. 28960, 28963, 28915, 28921, 28918).

** *Spicarum bracteæ imæ erecto-patentes.*

3. K. SCHŒNOIDES (*Bœck. in Linnæa*, xxxix. p. 7, not of *Henderson*) : culmis rigidis ; foliis canaliculato-complicatis ; spicis densis, oblongis ; bracteis ellipticis, obtusis ; nuce obovoideo-oblonga, obtusiuscula, a rostro brevi lineari coronata.—K. sibirica, *Turcz.* ; *Bœck. in Linnæa*, xxxix. p. 7.—Cobresia schœnoides, *Steud. Syn. Cyper.* 246.—Elyna schœnoides, *C. A. Meyer in Ledeb. Fl. Alt.* iv. p. 235 ; *Bunge, Verz. Altai-Gebirge*, p. 110.—E. sibirica, *Turcz.* ; *Ledeb. Fl. Ross.* iv. p. 262.—E. humilis, *C. A. Meyer* (exempl. authent.).—Carex curvula, *Bieb. Fl. Taur.-Cauc.* iii. p. 611, syn. excl. (teste *C. A. Meyer*).

Culmi 1–5½ dm., apice sæpe compressi. Folia in eadem cæspite culmis longiora aut multo breviora. Spicæ longæ 1½–3 cm., latæ 4–10 mm. ; spiculæ inferiores androgynæ ; flores in apice spicæ masculi. Bracteæ longæ 5–8 mm., fuscæ aut testaceæ, undique patentim suberectæ neque astrictæ. Spiculæ androgynæ 1–5-floræ ; flos imus fœmineus, 2–4 superiores masculi aut summi tabescentes. Flos fœmineus: gluma elliptica, involuta marginibus basi connatis; stylus glaber, linearis, basi haud incrassatus. Nux cum rostro longa 2½ mill., minute reticulata.—*K. capillifolia* differt bracteis astrictis, minus densis, nuce sublanceolata.—Kobresia schœnoides, *Henderson*, *Yarkand*, p. 339. n. 372, est K. Royleana.

Mts. Caucasus: fide Bieberstein. Regio Altaica: flumen Oka (*Turczaninow*); Soongaria (*Schrenk*). Himalaya alpina: a Kashmir ad Sikkim, frequens (*Jacquemont*, nn. 1542, 1596; *J. D. Hooker*, &c.).

4. K. NITENS, n. sp.: culmis rigidis; foliis canaliculato-complicatis; spicis densis, ellipticis; bracteis ovatis, obtusis; nuce late obovoidea, obtusa, erostri.

Culmi 1–2 dm., subcompressi. Folia cum culmis æquilonga. Spicæ longæ 1½ cm., latæ 7 mm.; spiculæ inferiores androgynæ; flores in apice spicæ masculi. Bracteæ longæ 5 mm., rotundatæ, nitidæ castaneæ. Spiculæ androgynæ 1–4-floræ; flos imus fœmineus, 1–3 superiores masculi aut summi tabescentes. Flos fœmineus: gluma elliptica, involuta, marginibus basi connatis; stylus vix ullus, aut saltem ab ipso ovario stigmatice flocculoso-scabridus. Nux longa 2½ mm., lata 1½ mm., apice truncata, erostris, a styli basi emarcido scabrido coronata, minute reticulata.—*K. schœnoidi* proxima, differt bracteis latioribus, nuce latiore erostri.

Kashmir borealis, alt. 3500–4000 metr. (*C. B. Clarke*, nn. 29697, 29840).

Sect. *b*. COMPOSITÆ. Spiculæ in imis ramis spicæ 1–5 fasciculatæ aut congestim subpaniculatæ. (Spicæ omnino simplices haud raro obviæ.)

5. K. CARICINA (*Willd. Sp. Pl.* iv. p. 206): culmis rigidis; foliis planis aut convolutis; spicis densis, vix interruptis; bracteis ovatis, obtusis, rarius breviter mucronatis; nuce late oblonga apice subito angustata a rostro lineari parva coronata.—*Schkuhr*, *Carex*, Suppl. p. 1, tab. Rrr. fig. 161; *Svensk. Bot.* viii. tab. 527. fig. 2; *Nees*, *Gen.* vol. ii.; *Reich. Cyper.* p. 2, tab. 193; *Benth. Handb. Brit. Fl. Illustr.* ii. p. 904, fig. 1092; *Syme*, *Eng. Bot.* tab. 1609; *Bœck. in Linnæa*, xxxv. p. 5.—Cobresia caricina, *Pers. Syn.* ii. 534; *Anderss. Cyper. Scand.* 15.—Carex bipartita, *Allion. Fl. Pedem.* ii. p. 265, tab. 89. fig. 5 (mala).—C. mirabilis, *Host.*

Gram. iv. p. 44, tab. 78.—Schœnus monoicus, *Engl. Bot.* t. 1410. —Elyna caricina, *Mertens et Koch, Deutsch. Fl.* i. p. 458; *Baxter, Brit. Bot.* vi. tab. 484.

Culmi 5–15 cm., subcompressi. Folia culmo breviora vel subæquilonga. Spicæ longæ 1–2½ cm., oblongæ aut ovatæ, fuscæ. Bracteæ 2–3 mm., fuscæ, obtusæ aut nervo breviter excurrente. Spiculæ androgynæ; flos imus fœmineus; superior, masculus aut sæpius tabescens. Flos fœmineus: gluma elliptico-oblonga, florem omnino involvens, marginibus subliberis, superne in nervis lateralibus minute scabra; stylus basi paullo dilatatus; floris superioris rudimentum lineare, planum, viride, 3-nerve, margine scabrum. Nux late oblonga, obscure reticulata; rostrum nuce 5–6-plo brevius.

In regionibus Arcticis hemisphærii borealis: Europa, Grœnlandia; America, fretum Behring; sparsa nec communis. In alpinis montium zonæ temperatæ borealis: Britannia, Alpes, Pyrenees (fide *Miégeville in Bull. Soc. Bot. France*, 1863, p. 81); Caucasus (fide *C. A. Meyer*, *Pflanz. Caucas.* p. 29); Mts. Rocky (America).

[Huic referenda est, fide Swartz, *Carex simpliciuscula*, Wahl. in Kong. Acad. Handl. Stockholm (1803) p. 141, a Turner in Anglia (Westmoreland) lecta; sed Wahlenberg scripsit "capsulis oblongis depressis ore integerrimo," et ex Steud. Syn. Cyper. 188, species ut vera *Carex* retinenda est; in Turner, Bot. Guide, nomen desideratur.]

6. K. STENOCARPA: culmis rigidis; foliis planis; spicis densis, vix interruptis; bracteis ovatis, obtusis, rarius breviter mucronatis; nuce lanceolata apice in rostrum elongato-conicum attenuata.—Elyna stenocarpa, *Karel. et Kiril. in Bull. Soc. Moscou*, 1842, p. 526.—Cobresia stenocarpa, *Steud. Syn. Cyper.* 246.

Culmi 15 cm., subcompressi; vaginæ inferiores fuscæ. Folia culmo breviora. Spicæ longæ 1½–2½ cm., ovatæ, fuscæ. Bracteæ 3–4 mm., fuscæ. Spiculæ androgynæ: flos imus fœmineus, 1–3 superiores masculi; spiculæ inferiores sæpe fœmineæ 1-floræ cum rudimento: flores in apice spicæ masculi. Flos fœmineus: gluma elliptico-oblonga involuta, marginibus subliberis; stylus basi conicus. Nux cum rostro longa 2 mm., angusta, superne attenuata, obscure reticulata; rostrum nuce brevius.—Exempla mea infra citata descripsi: nomen *stenocarpam* ex descriptione tantum Karelin-Kirilovii adduxi.

Soongaria: Mts. Alatau (fide *Karelin et Kirilow*). Kashmir: Pir Pinjul, alt. 3000 metr. (*C. B. Clarke*, nn. 28764, 28863, 28870).

Var. *β. Royleana* (sp. *Nees*; *Bœck. in Linnœa*, xxxix. p. 8, *non Henderson*): evolutior, magis nitida; culmis longis 5–7 dm., superne minutissime scabris; spicis pallide fuscis; bracteis sæpe mucronatis, ima interdum longius aristata.—Trilepis Royleana, *Nees in Edinb. New Phil. Journ.* 1834, p. 267, *Cyper. Ind.* 119; *Kunth*, *Enum.* ii. p. 535.—Kobresia Royleana, *Henderson*, *Yarkand*, p. 339, n. 370, *est* K. schœnoides.

Himalaya alpina, alt. 4000–5000 metr., a Sikkim (*J. D. Hooker*) ad Ladak (*T. Thomson*). Yarkand (*Dr. Henderson*).

7. K. PSEUDOLAXA: culmis laxis, foliis planis; spicis laxis, interruptis; bractea ima sæpius a folio terminata; nuce lineari-obovoidea apice breviter angustata.

Culmi 2–3 dm. Folia cum culmo sæpe æquilonga; vaginæ imæ aphyllæ testaceæ paucæ aut nullæ. Bractea ima sæpius 2–5 cm. longa. Spicæ 3–4 cm. longæ, 4- 8-spiculosæ. Spiculæ inferiores subdistantes, longæ 10–15 mm., sessiles, subdistichæ, densifloræ; flores 1 imus fœmineus, 3–6 superiores masculi. Gluma fœminea, elliptica, subobtusa, pallide castanea in dorso viridi in marginibus (involutis basi subconnatis) scarioso-lucida. Stylus linearis, cum $\frac{1}{3}$ parte nucis æquilonga; rami 3, longi, hispidi.—Species in Kashmir a me pro forma depauperata *Hemicaricis laxæ* habita, a Bentham (in dispositione generum) generice distincta. *Hemicaricis laxæ* formæ minores densiores differunt spiculis subpaniculatis, basi a 2 vel pluribus (raro ab 1) floribus fœmineis instructis.

Kashmir: Alibad, alt. 3000 metr. (*C. B. Clarke*, n. 28693).

Species mihi ignota.

8. K. FILIFOLIA: spica elliptico-oblonga, composita, spiculis 7–9-floris; flore inferiore fœmineo, reliquis masculis; caryopsi elliptica compressa, mucronata, stigmatibus 2; foliis filiformi-triquetris quam culmus plerumque brevioribus.—Elyna filifolia, *Turcz. Fl. Baical. Dahur.* ii. pt. 1, p. 288.

Planta 4–5-pollicaris. Folia omnia radicalia. Spiculæ sessiles 5–7, superiores magis approximatæ. Squamæ undique imbricatæ, inferiores 1–2 vacuæ. Flos inferior fœmineus, in spiculis superioribus interdum hermaphroditus; cæteri 6–8 masculi.

Dahuria: ad acidulas Ulataenses (*Sedakow*).

Species generi alienæ (aliis in Hemicarice inveniendis).

Kobresia cyperoides, *Willd. Sp. Pl.* iv. p. 206, est *Mariscus Jacquinii*, Kunth, fide Kunth, Enum. ii. p. 124.

Kobresia globularis, *Dewey in Sillim. Amer. Journ.* ser. i. xxix. p. 253, tab. Z. fig. 86, est *Carex filifolia*, Nuttall, fide Torrey (vide Boott, Carex, i. pp. 13, 14).

Elyna capillifolia, *Henderson, Yarkand*, p. 339, n. 371, est *Carex stenophylla*, Wahl.

Kobresia caricina, *Boiss. in Kotschy, Pl. Cilicens.* p. 131 *b.*, 16 *d.* est *Carex atrata*, Linn., var. *nigra* (sp. Allion.).

Hemicarex, *Benth. in Journ. Linn. Soc.* xviii. p. 367 ; *Benth. et Hook. f. Gen. Pl.* iii. p. 1072, *sp. capensibus excl.*—Kobresiæ sp., *Bœck. in Linnæa*, xxxix. p. 3.—Carex linearis, *Boott, Ill. Carex*, t. 136.

Spiculæ unisexuales, masculæ spicas fœmineas continuantes, glumis undique imbricatis, vel interdum omnino masculæ solitariæ ; fœmineæ 1-floræ, (rudimento rarius addito) spicatæ. Gluma œminea concava, marginibus basi vel usque ad medium connatis.

Perennes, radicibus lente fibrosis, glabræ (marginibus glumarum perraro minutissime pubescentibus). Culmi cæspitosi, fasciculati (vel in *H. laxa* paullulo distantes), læves vel minute scabri. Folia prope basin culmi plura, anguste linearia (vel in *H. laxa* folia caulina graminea), in marginibus (saltem prope apices) scabrida ; vaginæ imæ subaphyllæ, testaceæ (in *H. laxa* minus conspicuæ). Bracteæ et inflorescentia in duabus sectionibus diversæ.

Sect. *α*. SIMPLICES. Spica specie solitaria, simplex, linearis, basi fœminea, apice mascula ; quoad structuram ei *Caricis pulicaris* similis. (Spicæ fere fœmineæ aut omnino masculæ haud raro obviæ.) Bractea ima ovata obtusa aut apiculata, perraro elongata foliiformis.

* *Spicarum bracteæ imæ erectæ circa rhachin astrictæ.*

1. H. TRINERVIS (*Benth. et Hook. f. Gen. Pl.* iii. p. 1072) : foliis canaliculato-complicatis ; bracteis ovatis, imbricatis, fœmineis sæpe mucronatis ; nucis rostro longo, intra glumam incluso. —Carex trinervis, *Nees, Cyper. Ind.* 120, *non Degland.*—C. Esenbeckii, *Kunth, Enum.* ii. p. 522 ; *Boott in Trans. Linn. Soc.* xx.

p. 133; *Steud. Syn. Cyper.* 184.—C. linearis, *Boott*! *Carex*, i. p. 52, t. 136.—C. vidua, *Boott in Herb.*—Kobresia trinervis, *Bœck. in Linnæa*, xxxix. p. 4.

Culmi ½–4 dm., filiformes aut rigidi; vaginæ imæ testaceæ. Folia cum culmis subæquilonga. Spicæ longæ 5 cm., latæ 4 mm. Bracteæ longæ 5 mm., ovatæ, sæpe breviter aristatæ, pallide fuscæ. Spiculæ fœmineæ: gluma oblonga utriculiformis, marginibus usque ad dimidiam longitudinem connatis, in nervis 2 lateralibus scabra; stylus basi anguste conicus; floris superioris rudimentum gluma dimidio brevius, planum, viride, 3-nerve, marginibus scabrum a gluma minuta imperfecta interdum coronatum. Nux (cum rostro) longa 5 mm., lineari-oblonga, obscurius reticulata; rostrum conico-lineare cum nuce fere æquilongum.

Himalaya occidentalis, alt. 3500–3900 metr.: Kedarkanta (*Jacquemont*, n. 480); Gurwhal (*Royle*; *Strachey et Winterbottom*, n. 19); Choor (*Edgeworth*); Kashmir (*C. B. Clarke*, nn. 28754, 29266). Sikkim, alt. 4000 metr., Lachen (*J. D. Hooker*).

2. H. Hookeri (*Benth. et Hook. f. Gen. Pl.* iii. p. 1072); K. Hookeri (*Bœck. in Linnæa*, xxxix. p. 4): culmis tenuibus; foliis planis, usque ad basim in margine serrulatis; bracteis ovatis, imbricatis, fœmineis sæpe mucronatis; nucis rostro longo, e gluma exserto.—K. Hookeri *et* K. seticulmis, *Bœck. in Linnæa*, xxxix. pp. 3, 4.—Elyna, sp. 2, *Herb. Ind. Or., Hook. f. et T. Thoms.*—Carex Esenbeckii, *Herb. Ind. Or., Hook. f. et T. Thoms., non Kunth.*—C. (*melius* Kobresia) mutans, *Boott, MS. in Herb.*

Culmi ½–4 dm., læves (vel fide Bœck. sparse spinulosi); vaginæ inferiores testaceæ. Folia cum culmis subæquilonga, 5–7-striata. Spicæ longæ 5 cm., latæ 3 mm., fœmineæ apice tantum masculæ. Bracteæ, spiculæ floresque fere ut in *K. trinervi*, sed flos fœmineus angustior rudimento carens. Nux cum rostro longa 5 mm., linearis, obscurius reticulata; rostrum cylindrico-lineare, cum nuce fere æquilongum, paullo recurvatum, glumam superans.

Himalaya: in provincia Sikkim, alt. 3400–4000 metr., Lachen (*J. D. Hooker*). Singalelah (*C. B. Clarke*, n. 25648).

3. H. pygmæa: pygmæa; foliis canaliculato-complicatis; spicis paucifloris; bracteis ovatis obtusis vel fœmineis vix mucronatis; nuce subobtusa erostri.—Elyna, sp. n. 7, *Herb. Ind. Or., Hook. f. et T. Thoms.*

Culmi 1–4 cm., rigidiusculi; vaginæ inferiores testaceæ. Folia culmis subæquilonga. Spicæ longæ 5–8 mm. Bracteæ longæ

2–3 mm., ovatæ, interdum breviter mucronatæ, nigro-testaceæ; spicula mascula terminalis fusca. Spiculæ fœmineæ: gluma elliptica semiutriculiformis, marginibus deorsum late connatis, lævis; stylus vix ullus; floris superioris rudimentum nullum aut brevissimum. Nux longa 1–1½ mm., oblonga, apice subito angustata; testa obscurius reticulata.

Himalaya alpina: Kunawur in altissimis (*Jacquemont*, n. 1783); Ladak, in jugo Lanak (*T. Thomson*); Sikkim, prope Momay et Kongra Lama, alt. 4400 metr. (*J. D. Hooker*).

** *Bracteæ inferiores patentim suberectæ.*

4. H. FILICINA: culmis tenuibus; foliis planis; spicis linearibus; bracteis oblongis, acutis, aristatis, laxe imbricatis aut inferioribus paullo distantibus; nuce anguste oblonga.

Culmi ½–2½ dm.; vaginæ inferiores fuscæ. Folia culmis breviora. Spicæ longæ 2–3½ cm., latæ 3 mm., filiformes, subflexuosæ. Bracteæ intermediæ androgynæ in parvam scabram aristam angustatæ, imæ longius aristatæ, pallide fuscæ, inferiores patentim suberectæ neque astrictæ. Spiculæ fœmineæ: gluma ovata subobtusa, marginibus basi connatis; flos imus fœmineus, flores superiores 1–4 plus minus tabescentes. Stylus brevis, basi vix incrassatus. Nux apice breviter acutata minutissime reticulata; styli basis persistens, linearis, brevis, vix rostriformis.—Species *Caricem filicinam* referens, cum hac a T. Thomson lecta, ex hac a cl. Boott extricata; a Bentham in *Hemicarice* in herbario locata; inter *Kobresiam* et *Hemicaricem* videtur intermedia.

Himalaya: Fagu prope Simla (*T. Thomson*).

Sect. β. COMPOSITÆ. Spicæ compositæ; spiculæ inferiores e pluribus spiculis fœmineis 1-floris instructæ. Bracteæ imæ sæpe elongatæ foliiformes.

5. H. CURVIROSTRIS, n. sp.: culmis tenuibus; foliis planis; spicis anguste oblongis, laxis, vix interruptis; bracteis oblongis, acutis, imis aristatis vel subfoliaceis; nuce anguste oblonga, rostro cylindrico-lineari curvato e gluma exserto.—Elyna, sp. 10, *Herb. Ind. Or., Hook. f. et T. Thom.*

Culmi 1 dm.; vaginæ imæ fuscæ. Folia culmis subæquilonga. Spicæ longæ 3½ cm., latæ 5–7 mm., viridi-fuscæ; bractea ima aristata, interdum spicæ æquilonga. Spicæ (in exemplis lectis) subfœmineæ; nempe spiculæ propriæ 1-floræ, flore fœmineo, spiculis (admodum paucis) masculis prope apices ramorum spicæ additis. Gluma fœminea elliptica, vix acuta, involuta marginibus fere liberis. Ovarium in stylum attenuatum. Nux (cum rostro) longa 2 mm.; rostrum cum dimidio nucis propriæ æquilongum, conico-lineare, læve, minutissime reticulatum, a stylobasi flocculosa sæpe coronatum.

Himalaya: Sikkim, alt. 4000 metr. prope pagum Tungu (*J. D. Hooker*).

6. H. LAXA (*Benth. et Hook. f. Gen. Pl.* iii. p. 1072); culmis laxis foliatis; foliis planis; spicis elongatis, interruptis, subpaniculatis; bracteis oblongis, acutis, inferioribus aristatis vel imis sæpe foliiformibus; nuce anguste oblonga erostri, a styli basi lineari coronata.—Cobresia laxa, *Nees, Cyper. Ind.* p. 119.—Kobresia laxa, *Bœck. in Linnæa,* xxxix. p. 6.—Elyna? laxa, *Kunth, Enum.* ii. p. 534.

Culmi 3–8 dm.; usque ad $\frac{1}{3}$–$\frac{1}{4}$ longitudinis vaginis intecti; vaginæ imæ fuscæ, subaphyllæ. Folia culmis sæpe subæquilonga, laxa. Paniculæ longæ 2–10 cm., viridi-fuscæ; bractea ima longa 5–8 mm., aut aristata aut paniculæ subæquilonga, basi sæpe vaginans. Spicæ pseudosimplices, e pluribus fœmineis unica mascula spiculis; spiculæ propriæ 1-floræ, e flore fœmineo cum rudimento, spicula mascula pluriflora apice addita. Præterea spiculæ 2-floræ haud raro obviæ sunt, flore inferiore fœmineo, superiore masculo. Rudimentum floris superioris (quandoque præsens) lineare viride 3-nerveum, margine scabrum, bracteæ juxtapositum. Flos fœmineus: gluma oblongo-lanceolata, subutriculiformis marginibus basi connatis, in nervis lateralibus viridis scabra, apice interdum breviter bicuspidata; stylus cum ovario quasi-articulatus, usque ad basim stigmatum flocculoso-villosus; stigmata longa. Nux longa $1\frac{1}{2}$ mm., oblonga, apice rostro brevissimo lato terminata, lævis, minute reticulata; in rostro stylobasis villosa, subpersistens, linearis, subarticulata sæpe videtur.

Himalaya occidentalis, alt. 2000–4000 metr., communis; in provinciis Kashmir, Ladak, Nubra, &c. (*Royle, Winterbottom,* n. 574, &c.). Sikkim, alt. 3000 metr. (*J. D. Hooker*).

Schœnoxiphium, *Nees in Linnæa,* ix. p. 305; *Benth. et Hook. f. Gen. Pl.* iii. p. 1072.—Hemicaricis sp. africanæ, *Benth. et Hook. f. l. c.*

Flores unisexuales. Spiculæ completæ androgynæ etiamque in ipsissima planta spiculæ unisexuales haud raro obviæ. In spiculis completis flos imus fœmineus, superiores 1–4 masculi in rhachilla (cum gluma fœminea sæpe fere æquilonga) complanata plus minus alata binervi in marginibus hyalinis minute pilosa sustenti. Gluma fœminea admodum concava, marginibus approximatis liberis vel usque ad dimidiam partem connatis; glumæ masculæ obscurius distichæ. Stylus basi simplex; nux apice conico- (nec bulboso-)rostrata.

Culmi robustiores, foliati, in exemplis visis perennes cæspitosi.

Sect. *a*. VAGINATÆ. Bracteæ inferiores basi vaginatæ.

1. S. RUFUM (*Nees in Linnæa*, x. p. 201); spicis decompositis, inferioribus remotis e vagina pedunculatis; gluma fœminea ovata, apice truncata, multinervia; rhachilla (inter florem fœmineum et masculos) apice biauriculata; nuce late ellipsoidea aut ovali.—*Bœck. in Linnæa*, xli. p. 354.—S. Dregeanum, *Kunth, Enum*. ii. p. 529.—S. Ludwigii, *Hochst. in Flora*, 1845, p. 764.

Rhizoma lignosum, perenne. Culmi 3–6 dm., approximati, trigoni. Folia elongata, plana, in marginibus minute scabra; vaginæ aphyllæ fuscæ. Inflorescentia 2–3 dm. longa, lanceolata, laxa. Spicæ terminales sæpius spiculis masculis, multifloris, 5–10 mm. longis instructæ. Spiculæ androgynæ longæ 8 mm., 3–7-floræ, flore imo fœmineo, cæteris masculis. Spiculæ 1-floræ fœmineæ haud raro obviæ sunt, ideoque spicæ *specie* androgynæ basi 2 spiculis fœmineis instructæ videntur. Gluma fœminea longa 3 mm., stramineo-fusca, nervis circiter 13 viridibus validis striata, apice minute ciliato-pubescens, marginibus involutis usque ad basin liberis, rhachillæ dilatatæ arcte adpressis, fructus tempore ventricosa. Rachilla infra florem imum masculum fere linearis, 2 processibus ovatis aut lanceolatis serratis utrinque excurrentibus. Nux longa 3 mm., trigona, obtusa, stylobasi lineari.

Africa australis, *Drège*; Boschberg, alt. 1200 metr., *Macowan*, n. 1866.

2. S. BURKEI, n. sp.; spicis decompositis, inferioribus remotis vagina pedunculatis; gluma fœminea ovata, multinervia; rhachilla (inter florem fœmineum et masculos) ligulari, apice nuda; nuce anguste oblonga.—Hemicaricis sp. nova, *Benth. MS.*

Differt a *S. rufo* nonnisi nuce multo angustiore rhachilla apice nuda.

Africa australis, *Burke*, n. 211.

3. S. MEYERIANUM (*Kunth, Enum*. ii. p. 530): spicis decompositis, inferioribus vagina pedunculatis; gluma fœminea elliptica, tenuiore, apice bifida, subbinervi; nuce anguste oblonga.—

S. capense, *Bœck. in Linnæa*, xli. p. 353, *syn.* S. Sickmanniano *excl.*, *non Nees.*—Schœnus lanceus, *Thunb. Prod. Fl. Cap.* p. 17, *partim, fide Kunth.*—Hemicarex, sp., *Benth. et Hook. f. Gen. Pl.* iii. p. 1072.

Culmorum fragmenta longa 6 dm., trigona, lævia. Folia elongata, plana, rigida, lata 7 mm., in marginibus scabra; vaginæ floriferæ longæ 3 cm. Inflorescentia longa 2–3 dm., lanceolata, sublaxa; bracteæ sæpe nervo excurrente aristatæ vel subfoliiformes. Spicæ terminales sæpius masculæ, multifloræ, elongatæ, interdum longæ 2–3 cm.; spiculæ androgynæ longæ 1 cm., 3–6-floræ, flore imo fœmineo, cæteris masculis. Gluma fœminea longa 4–5 mm., fulvo-fusca, scariosa, marginibus liberis laxe involutis, parti masculæ spiculæ complanatim adpressa, exterior. Rhachilla inter florem imum et masculos dimidia parte glumæ fœmineæ brevior, complanata, anguste hyalino-alata, binervis. Nux longa 4 mm., lateribus parallelis, trigona; stylobasi lineari.

Africa australis, *Drège*; Mons Table, alt. 350 metr., *Bolus*, n. 2861.

4. S. CAPENSE (*Nees in Linnæa*, vii. p. 533): robusta; spicis decompositis, inferioribus vagina pedunculatis; spiculis numerosis pallidis densis anguste lanceolatis; gluma fœminea multistriata, marginibus arcte involutis usque ad basin liberis; nuce anguste oblonga.—S. Sickmannianum, *Kunth, Enum.* ii. p. 530?—Schœnus lanceus, *Thunb. Prodr. Fl. Cap.* p. 17.—Hemicarex, sp., *Benth. et Hook. f. Gen. Pl.* iii. p. 1072.

Culmi metrales, foliati, superne trigoni, scabridi. Folia cum culmis fere æquilonga, rigida, lata 7 mm., in marginibus scabra; vaginæ floriferæ longæ 4 cm. Inflorescentia longa 5 dm., ramis primariis laxe paniculatis, spiculis dense aggregatis; bracteæ sæpe nervo excurrente aristatæ aut foliiformes. Spiculæ terminales sæpius masculæ, multifloræ; laterales modo fœmineæ 1-floræ cum rudimento, modo androgynæ flore unico fœmineo pluribus masculis; rhachilla inter florem fœmineum et masculos cum gluma fœminea fere æquilonga, ligularis, binervis, angustissime hyalino-alata, apice nuda. Bracteæ longæ 5 mm., lanceolatæ, scarioso-stramineæ, in dorso 1-nerviæ, rarius obscure 3-nerviæ. Gluma fœminea viridis. Nux longa 4 mm., lateribus subparallelis, trigona; stylobasis paullo incrassata.—Species a cæteris distat spiculis angustis, bracteis scariosis.

Caput Bonæ Spei (*Zeyher*, n. 4442).

Sect. *β*. EVAGINATÆ. Bracteæ inferiores vix vaginatæ.

5. S. THUNBERGII (*Nees in Linnæa*, x. p. 201): spicis compositis anguste oblongis densis; gluma elliptica, multistriata, marginibus arcte involutis, basi connatis, rhachillam viridem scabram involventibus.—*Bœckeler in Linnæa*, xli. p. 355, *pro majore parte*.—Hemicarex, sp., *Benth. et Hook. f. Gen. Plant.* iii. p. 1072.

Cæspitosa, rhizomate elongato repente (*Bœckeler*). Culmi 1½ dm., læves, striati, vix trigoni. Folia culmos sæpe superantia, lata 2–3 mm. Inflorescentia longa 3 cm., lata 6 mm., viridis, ramis infimis vix distantibus; bracteæ latius ovatæ, scariosæ, in dorso 1–3 nervis viridibus striatæ, sæpius aristatæ aut foliiformes; pedunculi subnulli. Spiculæ pro maxima parte unisexuales; fœminea 1-floræ cum rudimento. Gluma fœminea longa 2–3 mm., specie utriculiformis, marginibus autem (in exemplis a me visis) imbricatis fere usque ad basin liberis. Rhachilla cum ¾ partibus glumæ fœmineæ æquilonga, latius dilatata, binervis, marginibus scariosis pilosulis apice subito angustata neque auriculata. Nux ellipsoidea, utrinque angustata, subacute trigona.—Culmi *Caricem arenariam* (quod ad aspectum) referunt.

Caput Bonæ Spei (*Dr. Pappe*).

6. S. ECKLONII (*Nees in Linnæa*, x. p. 200, *non Bœck.*): foliis angustissimis; spica oblonga, densa; fructibus gluma multistriata intectis, anguste lanceolatis, subrecurvatis, bracteam multo superantibus.

Culmi longi 2½ dm., læves, striatuli, vix trigoni, basim versus plurifoliati. Folia sæpius culmo multo breviora, rarius subæquilonga, lata 1½ mm. Spicæ longæ 1½ cm., latæ 1 cm., bracteis inferioribus longe superatæ; rami imi vix pedunculati, neque bractea vaginati, spiculas sessiles (in fructu substellæformes) proferentes; spicula ultima mascula, inferiores androgynæ; rhachilla inter florem fœmineum et masculos, cum gluma fœminea subæquilonga, lineari-obovata, complanata, apice non auriculata, binervis, marginibus hyalinis minute ciliatis. Bracteæ longæ 3–4 mm., ovatæ acutæ aristatæve, scariosæ, in dorso 3 nervis viridibus striatæ. Gluma fœminea longa 5–6 mm., elliptico-oblonga, marginibus arcte involutis, fere liberis. Rhachilla cum gluma fere æquilonga, interdum gluma longa terminata.

Caput Bonæ Spei (*Zeyher*, n. 4441).

Species a genere amovenda.

Schœnoxiphium ? Lehmanni, *Steud. Syn. Cyper.* p. 245, est *Carex Esenbeckii*, Bœck.

Uncinia, *Pers. Syn.* ii. p. 534; *Brown, Prodr.* p. 241; *Boott in Hook. f. Fl. New Zeal.* i. p. 285; *Benth. Fl. Austral.* vii. p. 433; *Bœck. in Linnæa*, xli. p. 339.—Caricis sp. (C. uncinata, *Linn. f. Suppl.* 413), *auctor.*

Spicæ specie simplices, basi fœmineæ, apice masculæ. Bracteæ undique imbricatæ, inferiores rarius paullo distantes, specie 1-floræ; fœminea singula utriculum includens, mascula singula (gluma auctorum) 3 (casu 2–1) stamina includens. Bracteæ ovatæ aut oblongæ, concavæ, obtusæ aut inferiores acutæ vel aristatæ, virides aut ferrugineæ, dorso 1-nerviæ rarius 1–3-nerviæ aut plicatæ, haud raro rigidiusculæ, vix carinatæ. E basi ovarii nascitur (lateraliter) seta rigida, superne teres, ex ore utriculi longe exserta, lævis (in *U. phleoide*, var. *trichocarpa* minute scabrida), apice valide uncata, aut in *U. Kingii* tenuiter uncata, vel imo (in sectione *Pseudocarice*) obsolete aut plane non uncata. Filamenta linearia aut laxa dilatata; antheræ lineares aut anguste oblongæ; connectivum supra antheram vix prolongatum. Styli 3-fidi, raro (casu ?) 2-meri. Nux trigona aut subcompressa, stylobasi sæpissime angusta.

Species sat notæ sæpius stoloniferæ videntur. Glabræ nisi interdum utriculi. Culmi erecti, teretes, striati, aut paullo trigoni, parum scabridi, foliati aut basin versus plurifoliati; vaginæ inferiores testaceæ aut fuscæ, imæ subaphyllæ. Folia angustissime linearia, plana, rarius convoluta, in marginibus sæpius scabrida, in lamina subtus haud raro sursum scabra.

Sect. 1. STENANDRA. Filamenta filiformia, non (aut in *U. macrophylla* leviter) dilatata.—Species australes aut antarcticæ. Utriculus sæpius glaber, in *U. leptostachya, Sinclairii, Lechleriana* parce pilosa. Nux oblonga, trigona, compressa, lævis, minute reticulata, apice tuberculo parvo (*i. e.* rostro subcylindrico minuto) superata.

§ 1. Spicæ lineares aut anguste oblongæ; bracteæ laxiuscule imbricatæ; rhachis pars inferior ante bracteas delapsas sæpius exposita.

1. U. LEPTOSTACHYA (*Raoul, Choix Pl. Nouv. Zél.* p. 12, tab. 5):

culmis elongatis, tenuibus; foliis longissimis, planis; spica lineari, tenui; utriculis anguste lanceolatis, superne minute scabro-pilosis, quam bracteæ parum longioribus; seta quam utriculus duplo longiore; nuce anguste oblonga.—*Hook. f. Handb. New Zeal. Fl.* 309; *Bœck. in Linnæa*, xli. p. 344.—U. distans *et* U. scabra, *Boott in Hook. f. Fl. New Zeal.* i. pp. 285, 286.—U. australis, *R. Br. Prodr.* 241 (*in Obs.*); *Spreng. Syst.* iii. p. 829 (syn. excl.), *non Pers.*—Carex uncinata, *Forst. Herb. partim, non n.* 338, *nec Linn. f.*

Culmi 5 dm., foliati, superne trigoni, scabri. Folia longa 3–4 dm., lata 2–3 mm. Spicæ 5–10 cm. Bracteæ laxe imbricatæ aut inferiores distantes, imæ acutæ aut aristatæ aut nervo excurrente viridi spicæ æquilongo, oblongo-lanceolatæ, dorso 1-nerviæ. Utriculus longus 6 mm. Filamenta filiformia.—Culmi cum bracteis virides, rarius rubentes. A speciebus vicinis sequentibus ope utriculi scabro-pilosi (nec glabri) distinguenda.

Nova-Zealandia, communis (*Colenso*, nn. 1642, 1705; *Cheeseman*, n. 172 &c.).

2. U. TENUIS (*Pœppig*; *Kunth, Enum.* ii. p. 535): culmis tenuibus, foliis longis, planis; spica lineari, demum tenui; bracteis basi saccatis; utriculis oblongo-lanceolatis, glabris, quam bracteæ vix longioribus; seta quam utriculus duplo longiore.—*Kunze, Syn. Riedgr.* p. 83, t. 21; *Desv. in Gay, Chile*, vi. p. 232, tab. 72. fig. 4.

Culmi 2–3 dm., foliati, superne trigoni scabri. Folia culmo paullo breviora, lata 1½–2 mm., subtus in lamina modo scabra, modo lævia. Spicæ 5–8 cm. Bracteæ laxe imbricatæ, inferiores vix remotæ, ellipticæ, acutæ, pallidæ, nervo viridi, subacutæ aut aristatæ, ima sæpe foliacea bractea parum brevior; basi circumscisse dehiscentes, rhachillæ alis cyathiformiter relictis. Utriculus longus 3 mm. Filamenta filiformia.

Chili (*Pœppig*, &c.). Fretum Magellan (*Lechler*, n. 1284, &c.).

3. U. RUBRA (*Boott*! *in Hook. f. Fl. New Zeal.* i. p. 287, t. 64 A): rubens, culmis rigidis, foliis canaliculato-complicatis; spica rigida, lineari; utriculis oblongo-lanceolatis, glabris, quam bracteæ parum longioribus; seta quam utriculus subduplo longiore.—*Hook. f. Handb. New Zeal. Fl.* 310.

Culmi 1½–2½ dm., stricti, basin versus plurifoliati, superne trigoni, scabri. Folia culmo sæpius multo breviora, rigida, convoluta, scabra. Spicæ 5 cm. Bracteæ laxe imbricatæ, inferiores sæpe distantes, oblongæ, subacutæ, ima haud aristata, pallide rubro-fuscæ, dorso obscurius 1-nerviæ. Utriculus longus 5 mm. Stylus linearis, basi ipsa tuberculatus. Filamenta filiformia.

Nova Zealandia (*Colenso*, nn. 604, 1602, 4063).

4. U. TENELLA (*R. Br.*! *Prodr.* 241): culmis filiformibus; foliis angustissime gramineis, planis; spica oblonga, densiuscula, debili; utriculis oblongo-lanceolatis, glabris, quam bracteæ vix longioribus; seta quam utriculus subduplo longiore.—*Hook. f. Fl. Tasm.* ii. p. 102, t. 152; *Benth. Fl. Austral.* vii. p. 433; *Bœck. in Linnæa*, xli. p. 339.—Carex tenella, *Poir. Encycl. Suppl.* iii. p. 282.

Culmi 1–2 dm. Folia plurima, flaccida, culmis sæpius longiora, lata 1–1½ mm. Spicæ longæ 2 cm., latæ 4 mm., densæ (rhachi autem mox exposita). Bracteæ lanceolatæ, acuminatæ, una vix mucronata, pallidæ, in dorso virides, 1-nerviæ. Utriculus longus 3 mm. Stylus linearis, basi parum incrassatus. Stamina in exemplis visis (saltem sæpissime) 2; sed exempla omnia fere fœminea (floribus masculis paucis) sunt; forsan forma altera, floribus masculis numerosis magis evolutioribus, ulterius lecta fuerit; filamenta filiformia.—Differt ab *U. filiformi* foliis planis, spica breviore multo densiore.

Australia: flum. Derwent (*R. Brown*, n. 6071); Victoria (*F. Mueller*); Tasmania (*Gunn*, n. 975; *Oldfield*, n. 124).

5. U. FILIFORMIS (*Boott*! *in Hook. f. Fl. New Zeal.* i. p. 286): culmis filiformibus; foliis filiformibus, convolutis; spica lineari, breviuscula, laxa; utriculis lanceolatis, glabris, bracteas vix superantibus; seta quam utriculus subduplo longiore. *Hook. f. Handb. New Zeal. Fl.* 310.

Culmi 10–15 cm., debiles. Folia culmis longiora, lata 1–1½ mill., sed convoluta. Spicæ longæ 2 cm., latæ 3 mm. Bracteæ lanceolatæ acutæ; ima modo vix mucronata, modo aristata, modo foliiformis spicam superans, pallidæ, dorso 1-nerviæ. Utriculus longus 3 mm. Filamenta filiformia.—Bractea ima, in exemplis typicis Boottii, haud raro spicam superans.

Nova-Zealandia (*Colenso*, n. 1641).

6. U. DEBILIOR (*F. Muell.*! *Fragm. Phyt. Austral.* viii. p. 151): culmis longis, filiformibus; foliis longis, angustissimis, planis; spica lineari, debili; utriculis lanceolatis, glabris, quam bracteæ vix longioribus; seta quam utriculus subduplo longiore.—*Benth. Fl. Austral.* vii. p. 435.

Culmi 3–4 dm., debiles. Folia culmis longiora, numerosa, lata 1–1½ mill. Spicæ longæ 4 cm. Bracteæ lanceolatæ, acutæ, ima sæpe nervo excurrente foliiformi spicam superans, pallidæ aut virides, dorso 1-nerviæ. Utriculus longus 3 mm. Filamenta filiformia.—An *U. ripariæ* forma debilior?

Australia: ins. Lord Howe (*Fullagar*).

7. U. RIPARIA (*R. Br.*! *Prodr.* 241): culmis longis, tenuibus; foliis longis, planis; spica lineari, laxa; utriculis lanceolatis, glabris, quam bractea longioribus; seta quam utriculus vix duplo longiore.—*Hook. f. Fl. Tasm.* ii. p. 102, tab. 152 B; *Benth. Fl. Austral.* vii. p. 434.—Carex riparia, *Poir. Encyl. Suppl.* iii. p. 282.

Culmi 3–4 dm., debiles. Folia cum culmis sæpe æquilonga, lata 2 mm. Spicæ longæ 5 cm., latæ 4 mm. Bracteæ oblongo-lanceolatæ, pallidæ, in dorso uninerviæ, virides; imæ sæpius distantes, acutæ, rarius nervo excurrente aristatæ. Utriculus longus 5–6 mm. Filamenta filiformia.

Australia: Victoria, alt. 3000–4000 ped. (*F. Mueller*); Tasmania: flum. Derwent (*R. Brown*, n. 5072; *Oldfield*, n. 101).

β. affinis (sp., Colenso MS.): bracteæ imæ nervo excurrente spicam sæpe superante.—U. cæspitosæ var., *Boott, MS.*

Neo-Zealandia (*Colenso*, n. 1643).

γ. Banksii (sp., Boott in Hook. f. Fl. New Zeal. i. p. 287): foliis angustioribus, latis 1½ mm., bracteis utriculo fere dimidio brevioribus.—*Hook. f. Handb. New Zeal. Fl.* i. p. 310; *Bœck. in Linnæa*, xli. p. 341.

Neo-Zealandia (*Colenso*, n. 1816; *Cheeseman*, n. 175; *Cunningham*, n. 286, &c.).—Hoc loco disponenda videtur planta a Dr. Lyall in Neo-Zealandia lecta, a manu Boottii "*U. filiformis*?" notata.

8. U. RUPESTRIS (*Raoul in Ann. Sc. Nat.* (1844) ii. p. 117; *Choix, Pl. Nouv. Zél.* p. 13, tab. 5): culmis tenuibus, haud elongatis; foliis longis planis; spica lineari, laxa; bracteis fuscis aut subcastaneis, quam utriculi parum brevioribus; seta quam utriculus vix duplo longiore.—*Hook. f. Handb. New Zeal. Fl.* p. 310. —U. Hookeri, *Boott in Hook. f. Fl. Antarct.* i. p. 91, tab. 51; *Bœck. in Linnæa*, xli. p. 341.—U. riparia, *Hook. f. in Hook. Lond. Journ. Bot.* iii. (1844) p. 416, ? *R. Br.*

Culmi 10–15 cm. Folia culmis longiora. Spicæ basi continuæ vel interruptæ. Bracteæ dorso virides, margine interdum anguste albo-scariosæ; ima mutica aut nervo excurrente foliiformis.—Ab

U. riparia vix nisi colore bractearum differt; et exemplum viridibracteatum (a Travers lectum) a manu Boottii "*U. rupestris?*" notatum, videtur *U. ripariæ* similis.

Neo-Zelandia (*Stephenson*, n. 110 &c.); ins. Campbell et ins. Lord Auckland (*J. D. Hooker*).

9. U. CÆSPITOSA (*Colenso MS.*; *Boott in Hook. f. Fl. New Zeal.* i. p. 287): culmis longis, tenuibus; foliis longis, planis; spica angustissime oblonga, laxa; bracteis pallidis aut scarioso-viridibus; utriculis oblongis subito acuminatis, quam bracteæ vix longioribus; seta quam utriculus subduplo longiore.—*Hook. f. Handb. New Zeal. Fl.* p. 310.

Culmi 3 dm., foliati. Folia culmis plerumque longiora, lata 2–3 mm. Spicæ longæ 7 cm., basi vix interruptæ. Bracteæ pallidæ aut virides, acutæ, ima vix mucronata aut sæpius nervo excurrente spicam superans. Utriculus longus 7 mm. Filamenta filiformia.—Species ex sententia cl. Hookeri loc. cit. nimis exquæsita, sed (exemplis quibusdam aliunde relatis) videtur bona; differt ab *U. riparia* et *rupestri* utriculis majoribus, ab *U. australi* spicis brevioribus, viridibus.

Neo-Zealandia (*Colenso*, nn. 1644, 4161, 4169; *Cheeseman*, n. 174; *Kirk*, n. 134.)

10. U. AUSTRALIS (*Pers. Syn.* ii. p. 534); culmis elongatis, tenuibus; foliis longis, planis; spica elongato-lineari, densiore; bracteis fuscis aut subcastaneis, oblongis acutis subuninerviis, superioribus vix quam utriculi longioribus; seta quam utriculus vix duplo longiore.—*Hook. f.*! *Handb. New Zeal. Fl.* p. 309; *Bæck. in Linnæa*, xli. p. 342, *nec R. Br. nec Spreng.*—U. Lindleyana, *Kunth*!, *Enum.* ii. p. 526.—U. compacta, *A. Rich. Voy. Astrolabe*, p. 118, *non R. Br.*—Carex uncinata, *Linn. f. Suppl.* 413; *Forst.*! *Prodr.* p. 65, n. 338.

Culmi 3–5 dm., foliati. Folia culmos sæpe superantia, lata 2–6 mm., subtus in lamina scabra aut lævia. Spicæ longæ 14 cm., latæ 5 mm., densiuscule imbricatæ; rhachis autem basim spicæ versus sæpissime exposita est. Bracteæ longæ 6 mm., inferiores interdum paullo prolongatæ, ima subaristata aut rarius nervo excurrente spicam superans. Utriculus longus 6 mm. Filamenta filiformia.

Neo-Zealandia, frequens (*Raoul*; *Colenso*, nn. 82, 339, 1645; *Cunningham*, n. 286; *Haast*, n. 185). Ins. Owhybee, *i. e.* Hawaii (*Macrae*).

11. U. FERRUGINEA (*Boott in Hook. f. Fl. New Zeal.* i. p. 288, t. 64. B): culmis elongatis, tenuibus; foliis longis, planis; spica elongato-lineari, densiore, bracteis castaneis, oblongis, caudatis, in dorso 3-nerviis, superioribus utriculum longe superantibus; seta quam utriculus vix duplo longiore.

Vix ab *U. australi* sat diversa. Bracteæ superiores (in exemplo primario typico) longæ 11 mm., utriculis fere duplo longiores, nitide castaneæ, nervis 3 viridibus sat explicatis. Sed cum hoc exemplo Boott ordinavit flagulas duas (Ralph, n. 26; Colenso, n. 4024), quibus bracteæ superiores vix utriculis longiores dorso subuninerviæ videntur: hæ mihi *U. australis* sunt.

Neo-Zealandia (*Colenso*, n. 1646).

12. U. RIGIDULA (*Steud. Syn. Cyper.* p. 245): "culmo rigidulo, triquetro, erecto (subpedali), foliato; foliis anguste linearibus, strictis, margine vix scabriusculis, culmum multo superantibus (vix 1‴ latis); spica tereti, solitaria, elongata (4-pollicari), apice attenuata, mascula, basi nuda, densiflora; squamis lanceolatis, obtusiusculis, fusco-ferrugineis, glabris, nitidis; fructibus ovato-triquetris, lævibus; arista validula, fructu fere duplo longiore."

Mihi ignota.

Neo-Zealandia (*fide Steudel*).

§ 2. Spicæ oblongæ aut ovatæ; bracteæ densius imbricatæ; rhachis pars inferior a bracteis obtecta.

13. U. SINCLAIRII (*Boott MS.*; *Hook. f. Handb. New Zeal. Fl.* p. 309): culmis subrigidis; spicis anguste oblongis; bracteis ovatis, in dorso plurinerviis aut plicatis; utriculis bracteas subæquantibus, scabride pilosis.

Culmi 10–18 cm., vix trigoni, basim versus plurifoliati. Folia brevia aut culmos superantia, lata 2 mm., plana, parum scabrida. Spicæ longæ $2\frac{1}{4}$ cm., latæ 6 mm., subpaucifloræ. Bracteæ longæ 6 mm., obtusiusculæ, ima vix acutata, stramineæ, in marginibus scariosæ. Seta utriculo subduplo longior.

Neo-Zealandia: Nelson (*Sinclair*); lacus Tennyson, alt. 1000 metr. (*Travers*).

14. U. COMPACTA (*R. Br.! Prodr.* p. 241): culmis rigidis, haud elongatis; foliis planis, haud elongatis; spicis oblongis, abbreviatis; bracteis ovato-lanceolatis, 1-nerviis; utriculis oblongis, acutis, glabris, bracteas haud superantibus; seta quam utriculus subduplo longiore.—*Hook. f. Fl. Tasm.* ii. p. 103, tab. 153. B; *Hook. f.*

Handb. New Zeal. Fl. 309; *Benth. Fl. Austral.* vii. p. 434, *non A. Rich.*—U. divaricata, *Boott! in Hook. f. Fl. New Zeal.* i. p. 286.—Carex compacta, *Poir. Encycl. Suppl.* iii. p. 282.

Culmi 5–20 cm., trigoni, basim versus plurifoliati. Folia longa 6–12 cm., rigidiuscula, lata 2–3 mm., subconcava, marginibus vix incurvatis, culmis sæpius multo breviora, interdum longiora. Spicæ longæ 2½ cm., latæ 6 mm. Bracteæ longæ 5 mm., subacutæ, ima acuta aut nervo excurrente spicam sæpe superans, subcastaneæ, in dorso virides 1-nerviæ, in marginibus vix scariosæ. Utriculi longi 5–6 mm., acuti, densiusculi, fructus tempore divaricati. Filamenta linearia.

Tasmania: flum. Derwent (*R. Brown*, n. 6073); Mons Wellington (*Gunn*, n. 1408), &c. Neo-Zealandia (*Travers; Dr. Lyall*). Terra Kerguelen (*Eaton; Moseley*). Ins. Amsterdam (*De l'Isle*, n. 34).

β. *nervosa* (sp., Boott! in Hook. f. Fl. Tasm. ii. p. 102, t. 153 A): spicis paullo angustioribus, squamis pallidioribus minus acutis, in dorso 3-nerviis aut plicatis, in margine distinctius scariosis.

Tasmania (*Gunn*). Australia: Victoria, Mont. Baw-Baw, alt. 1000 metr. (*F. Mueller*). Neo-Zealandia: in valle Clarence (*Heeton in Mus. Brit.*).

γ. *viridis*; bracteis multo minus densis, viridibus.—U. Hookeri?, *Colenso MS.*—U. compacta β, *Boott MS.*—U. compacta, var. divaricata, *Hook. f. Handb. New Zeal. Fl.* p. 309, *partim, non* U. divaricata, *Boott.*

Folia culmum longe superantia. Forsan melius cum *U. rupestri* conjungenda.

Neo-Zealandia (*Colenso*, n. 1640).

δ. *elongata*; culmis 3½ dm., laxis; foliis elongatis, culmum superantibus; spica (quam *U. compactæ* typicæ) angustiore; bracteis pallidioribus viridescentibus.

Ins. Amsterdam (*De l'Isle*, n. 55).

15. U. Kingii (*R. Br.! MS.*; *Boott in Hook. f. Fl. Antarct.* ii. p. 370, tab. 145): parva; spicis ovatis, densis, capitatis, subpaucifloris; bracteis oblongis, acutis, castaneis, quam utriculi multo brevioribus; utriculis lanceolatis, apice attenuatis, lineari-cylindricis; seta brevissime uncinata.—*Desv. in Gay, Chile*, vi. p. 232.

Culmi 5 cm., stricti, rigidiusculi, foliati. Folia culmis longiora aut breviora, tenuia, plana, lata 1½ mm. Spicæ circiter 1 cm. diam. Bracteæ 5 mm., in dorso pallidiores, subuninerviæ, ima vix mucronata. Utriculi longi 7 mm., castanei, superne teretes, anguste cylindrici, glabri. Seta utriculo $1\frac{1}{2}$ longior, viridis, quam in cæteris *Unciniis* multo debilior, filiformis, apice infra uncum minutissimum sæpe flexuosa incurva aut emarcida (ut a Boott depicta).

Fretum Magelhan (*Capt. King*; *Capt. Wilkes*).

16. U. LECHLERIANA (*Steud.*! *Syn. Cyper.* p. 244): culmis elongatis, robustioribus; foliis elongatis, planis; spicis oblongis; utriculis ellipticis subacutis, superne subscabris in margine setulosis, quam bracteæ vix longioribus.—*Bœck. in Linnæa*, xli. p. 343.

Culmi 4 dm., foliati, vix trigoni. Folia culmos superantia, lata 5 mm. Spicæ longæ 5 cm., latæ 7 mm. Bracteæ longæ 7 mm., inferiores sensim majores ac latiores, dorso virides, 1-nerviæ aut inferiores plicatæ, subplurinerviæ, in marginibus læte castaneæ, apice acutæ, ima vix mucronata (aut fide Bœckeler subfoliaceo-prolongata). Utriculi longi 5–7 mm., stipitati, fuscescenti-virides, parce aut obscure pilosæ. Seta utriculo subduplo longior.

Fretum Magelhan (*Lechler*, n. 1285).

17. U. MACROPHYLLA (*Steud. Syn. Cyper.* p. 244): culmis elongatis, robustioribus; foliis elongatis, planis; spica breviter oblonga, densissima; bracteis late ellipticis, in dorso plurinerviis, in margine late scariosis, quam utriculi glabri longioribus.—*Bœck. in Linnæa*, xli. p. 343.—U. phalaroides, *Boott MS.*, *non Nees.*

Culmi 6 dm., foliati, trigoni. Folia cum culmo fere æquilonga, lata 4 mm. Spicæ longæ 3 cm., latæ $1\frac{1}{4}$ cm. (iis *Phalaridis canariensis* similes), stramineo-virides, lucidæ. Bracteæ longæ 8 mm., in margine mox laceræ. Utriculi late oblongi, subtrigoni, apice attenuati, rostrati. Filamenta elongata, linearia, prope medium paullo complanata.

Chili: Corral et in montanis prope Aricam (*Philippi*, nn. 770 et 770 a); Corral prope Valdiviam (*Bridges*, n. 823).

Sect. 2. PLATYANDRA. Filamenta linearia, camplanata, sæpius cum antheris æquilata.—Species omnes ex America tropica, Chili aut Oceano Australi enatæ.

§ 1. Spicæ densissimæ; bracteæ utriculis breviores, tempore fructus immaturi rhachi haud astrictæ.

18. U. ERINACEA (*Pers. Syn.* ii. p. 534): foliis planis, junioribus

subtus sursum scabris; spicis breviter linearibus; utriculis rostratis, setosis, demum rostro recurvo divaricatis; nuce obovoidea, obtusa, erostri, seta quam bractea 5plo longiore.—*Desv. in Gay, Chile,* vi. p. 231, tab. 72. fig. 5; *Bœck. in Linnæa,* xli. p. 352.—U. longifolia, *Kunth, Enum.* ii. p. 527; *Bœck. in Linnæa,* xli. p. 348, *non Desv. in Gay.*—U. Philippii, *Hohenack. in Pl. Philippi,* n. 177; *Steud. Syn. Cyper.* p. 243.—U. longearistata, *Steud. Syn. Cyper.* 243.—Carex erinacea, *Cav. Ic.* v. p. 40, tab. 464. fig. 2; *Schk. Carex,* ii. p. 32, tab. Nnnn. fig. 201.

Stolonifera. Culmi 5–8 dm., robustiores, foliati; vaginæ summæ sæpe in parte superiore culmi sitæ, interdum distantes. Folia culmum superantia, lata 5–15 mm. Spicæ longæ 6 cm., latæ 9 mm., basi breviter aut longius acutatæ; pars fœminea superne parum clavata, subito in partem masculam brevem attenuata. Bracteæ inferiores longæ 4–3 mm., late ellipticæ, vix acutæ, ima rarius nervo excurrente aristata, virides, 3–4-nerviæ, marginem versus subcastaneæ, margine ipso scariosæ; bracteæ superiores sensim minores in glumas masculas breves consimiles transeuntes. Utriculi longi 4 mm., obovati, inflati, compressi, in rostrum anguste conicum subito angustati, ferruginei, viridi-striati aut magis fuscati, superne parce hirtuli aut (in *C. longifolia,* Bœck.) dense nigro-fusco hispiduli. Nux utriculo minor; stylobasis anguste oblonga, obscure trigona. Seta luteo-viridis, valida, fructus tempore horizontaliter divaricata.—In *U. erinacea,* typ. Bœck., bracteæ fœmineæ superne parce hirtulæ, setæ utriculo 5plo longiores: in *U. longifolia* typ. Bœck. (= *U. Philippii,* Hohenack.), utriculi ferruginei in rostrum longum attenuati superne ubique hispiduli, setæ utriculo plus duplo longiores. Ex Boott (in Herb.) *U. longifolia,* Kunth, ab *U. erinacea* solum differt spica angustiore, perigyniis sordide rufis, rostro longiore, foliis angustioribus longioribus glabriusculis.

Chili: ab Arica usque ad Ins. Chiloe (*Bridges,* n. 824; *Lechler,* nn. 567 partim, 3214; &c.).

β. longifolia (sp., Kunth, Enum. 2. p. 527): spica angustiore, utriculis angustioribus dense hispidulis, seta quam utriculus triplo longiore.

Chili (*Philippi,* n. 177); Chiloe (*Capt. King* in herb. R. Brown).

19. U. MULTIFARIA (*Nees in Herb. Lindl.*; *Boott in Hook. f. Fl. Antarct.* ii. p. 369): foliis longis, planis; spicis late oblongis basi attenuatis, superne clavatis; nuce anguste oblonga; seta

quam utriculus subduplo longiore.—*Desv. in Gay, Chile*, vi. p. 229, tab. 73. fig. 23; *Bœck. in Linnæa*, xli. p. 351 (*syn.* U. Philippi *excl.*).

Stolonifera. Culmi 5–8 dm., robustiores, foliati. Folia sæpe culmum superantia, lata 5 mm., parum scabra. Spicæ longæ 7 cm., latæ 12 mm., inter omnes *Uncinias* densissimæ, apice in parte mascula spicæ brevissima subito truncatæ. Bracteæ inferiores longæ 4 mm., oblongæ, subobtusæ, ima rarius acuta vix mucronata aut (in uno exemplo) foliiformis latiuscula culmum longissime superans, pallide virides, obscurius 1-nerviæ, in margine scarioso-subfuscæ, superiores 2 minores in glumas masculas consimiles transeuntes. Utriculi longi 5 mm., late vix 1 mm., superne angustati, hirtuli, fusco-virides. Nux apice obtusa; stylobasis sublinearis, vix incrassata. Setæ validæ, proventu erecto-patentes.

Chiloe (*Cuming*, n. 44; *Capt. King*; *Lobb*). Chili: Valdivia (*Bridges*, n. 826); Corral (*Philippi*).

β. macrostachya (sp., Desv. in Gay, Chile, vi. p. 229, tab. 72. fig. 2); spica crassissima, densiflora, elliptica, basi non attenuata. Chili: Antuco (*Poeppig*, fide *Desvaux*).

20. U. PHLEOIDES (*Pers. Syn.* ii. p. 534); foliis longis, planis; spicis linearibus; utriculis oblongo-linearibus, bracteas longiuscule superantibus, superne hispidulis; nuce anguste oblonga; seta utriculo 1½plo longiore, non scabrida.—*Desv. in Gay, Chile*, vi. p. 225, tab. 72. fig. 6.—U. lasiocarpa, *Steud.*; *Bœck. in Linnæa*, xli. p. 349.—U. trichocarpa, *Bœck. in Linnæa*, xli. p. 350.—U. longifolia, *Desv. in Gay, Chile*, vi. p. 226, tab. 72. fig. 1 (fig. 1 u′ *excl.*).—U. Urvillei, *Steud. Syn. Cyper.* p. 243.—Carex phleoides, *Cav. Ic.* v. p. 40, t. 464. fig. 1.

Stolonifera. Culmi 5–3 dm., robustiores, foliati. Folia sæpe culmum superantia, lata 5 mm., parum scabra. Spicæ longæ 10–15 cm., latæ 6 mm.; pars mascula brevissima. Bracteæ inferiores longæ 5–4 mm. oblongæ, obtusiusculæ, ima vix acuta aut nervo excurrente spicam longe superans, virides, subfuscæ, obscurius 1-nerviæ, in margine scariosæ, superiores minores in glumas masculas consimiles transeuntes. Utriculi longi 7–5 mm., virides aut fusci. Nux pallide fusca; stylobasis linearis, basi vix incrassata.

America australis: in regione Andina ab Ecuador usque ad Valparaiso, frequens; Ecuador, alt. 2800 metr. (*Spruce*, n. 5140);

Colombia et Peru (*Jameson*, nn. 188, 313, 881); Bolivia, in provincia Larecaja, alt. 3500 metr. (*Mandon*, n. 1424); Chili, Arica (*Lechler*, n. 567 *a*); Valdivia (*Bridges*, n. 825), &c.

β. *nux-nigra*: spica bracteis ipsaque nuce nigrescentibus.—U. trichocarpa, *Desv. in Gay, Chile*, vi. p. 227, tab. 72. fig. 3, *vix C. A. Meyer*.

Ecuador: in Pichincha (*Jameson, sine num.*).

γ. *clavata*: spica abbreviata, clavata, densissima, utriculis admodum hispidis.—U. longifolia, *Philippi, MS.*, *non Kunth.*—U. trichocarpa, "var. arista glabra, *non C. A. Meyer*," *Boott, MS.*

Hæc varietas inter *U. phleoidem* et *U. multifariam* fere intermedia videtur.

Chili: Corral (*Philippi*).

δ. *trichocarpa* (sp., C. A. Meyer in Mém. Acad. Imp. St. Pétersb. 1 [1831] p. 205): bracteis laxiusculis quam utriculi vix brevioribus, seta scabrida.—*Hohenacker in Pl. Philippi.*

Chili: Valdivia (*Philippi*, n. 504); Valparaiso (*Herb. Boott*).

ε. *longispica* (sp., Bœck.! in Flora, 1858, p. 650, in Linnæa, xli. p. 347): bracteis densiusculis utriculos paullo superantibus, seta minutissime scabrida.—U. Cumingii, *Boott, MS.*—U. chorostachys, *Philippi, MS.*

Chili: Valparaiso (*Cuming*, n. 472); Corral (*Philippi*).

§ 2. Spicæ lineari-cylindricæ; bracteæ minus densæ, imbricatæ, tempore fructus immaturi rhachi astrictæ.

21. U. Jamaicensis (*Pers. Syn.* ii. p. 534): foliis elongatis, planis, angustissimis; spicis anguste linearibus; utriculis oblongis, breviter acutis, quam bracteæ vix longioribus, superne hispidulis; nuce oblonga, stylobasi anguste oblonga parum incrassata.—*Kunth, Enum.* ii. p. 525; *Bœck. in Linnæa*, xli. p. 347 (*syn.* U. mexicana *excl.*).

Culmi longi 3–6 dm., debiles. Folia culmos sæpe superantia, lata 3 mm., tenuia, in lamina subtus glabra aut scabra. Spicæ longæ 10 cm., latæ 3–4 mm. Bracteæ longæ 4 mm., ellipticæ, subobtusæ, ima non aristata, virides aut fuscæ, dorso subplicatæ aut obscurius 1-nerviæ, margine vix aut non scariosæ. Utriculi cum bracteis subæquilongi, apice acuti vix acuminati. Setæ validæ, proventu erecto-patentes, utriculis vix duplo longiores.

Jamaica (*Stokes*; *Shakespeare*; *Herb. Borrer*). Venezuela (*Moritz*, n. 634): Tovar (*Fendler*, n. 1583); Caracas (*Burshel*). Neo-Granada (*Lindig*, n. 1419). Ecuador: in Pichincha (*Jameson*, nn. 190, 284); in Andibus (*Spruce*, n. 5405).

22. U. MEXICANA (*Liebm. Mexic. Halfgr.* 84): foliis elongatis, planis; spicis anguste linearibus; utriculis obovato-oblongis, breviter acutis, superne hispidulis, quam bracteæ vix longioribus; nuce late oblonga; stylobasi dilatata, trigona, subpyramidata.—*Steud. Syn. Cyper.* 243.—U. Galeottii, *Boott MS.*—U. jamaicensis, *Bœck. in Linnæa*, xli. p. 348, partim.

Culmi 5–8 dm., robustiores. Folia culmos sæpe superantia, lata 8–11 mm. Spicæ longæ 17 cm., latæ 4 mm. Bracteæ late ellipticæ, quam *U. Jamaicensis* latiores. Utriculi longi 5 mm.—Quasi *U. Jamaicensis* forma evolutior, bracteis utriculisque majoribus; præsertim distans foliis latioribus, stylobasi pyramidata.

Mexico: Mirador (*Liebmann*); Oaxaca, alt. 1000 metr. (*Galeotti*, n. 5720). Guatemala (*Godman et Salvin*).

23. U. GRACILIS (*Petit-Thouars, Tristan d'Acunha*, p. 35, tab. 5, *syn. excl.*): foliis elongatis angustissimis; spicis anguste linearibus; utriculis anguste oblongis acuminatis, superne parce hispidulis, quam bracteæ parum longioribus; nuce oblonga, stylobasi vix incrassata.—U. breviculmis, *Carmichael in Trans. Linn. Soc.* xii. p. 508.

Culmi 10–15 cm., stricti. Folia culmum longe superantia, lata 3 mm., rigidiuscula marginibus paullo involutis, subtus in lamina sæpe sursum scabra. Spicæ longæ 12 cm., latæ 3 mm. Bracteæ longæ 5 mm., late ellipticæ, subacutæ, virides, in margine scarioso-fuscæ, obscurius 1-nerviæ. Utriculi intra bracteas inclusi aut brevissime exserti, superne in marginibus leviter hispiduli. Setæ validæ, suberectæ, bracteis 1½ longiores.

Ins. Tristan d'Acunha (*MacGillivray*, n. 333; *Milne*; *Carmichael*).

β. *gracilis* (sp., Petit-Thouars, Tristan d'Acunha, p. 35, tab. 6): foliis abbreviatis, rigidis; culmis crassis, validis; spica breviore, latiore.

Culmi (in eadem planta) foliis multo breviora aut multo longiora. Folia longa 10–15 cm., erecta, rigida. Spicæ longæ 5 cm., latæ 4 mm.

Ins. St. Paul (*De l'Isle*, n. 7).

γ. *macloviana* (sp., Gaud. in Freycinet, Voy. Bot. p. 412):

utriculis superne magis hispidis, bracteas spatio 1 mm. sæpe superantibus.—*Bœck. in Linnæa*, xli. p. 345.—U. de la Costa, *Steud. in Pl. de la Costa*, n. 1458.—Unciniæ sp. (U. Douglasii affinis), *Desv. in Gay, Chile*, vi. p. 229.

Quoad cætera cum *U. gracili*, Thouars, typ. omnino congruens. Culmi interdum 2–3 dm., stricti, paullo tenuiores.—*Brongn. in Duperrey, Voy. Bot. Phan.* p. 159, hanc plantam cum *U. phleoide* (quæ toto cœlo distat) conjunxit. *U. jamaicensis* huic revera valde affinis differt nonnisi utriculis acutis nec acuminatis.

Ins. Maclovianæ, *i. e.* Isles Malouines, Falkland Isles (*fide Gaudichaud*). Chili: Valdivia (*De la Costa*, n. 1458; *Bridges*, n. 822).

24. U. Douglasii (*Boott! in Hook. f. Fl. Antarct.* ii. p. 369): foliis elongatis, angustissimis; spicis filiformibus; utriculis anguste oblongis, acuminatis, superne hispidulis, quam bracteæ paullo longioribus; nuce anguste oblonga, stylobasi paullo incrassata.—*Desv. in Gay, Chile*, vi. p. 228; *Bœck. in Linnæa*, xli. p. 346.

Vix ab *U. gracili* var. *macloviana* spicis angustioribus distinguenda. In exemplo typico in herb. Boott, spica longa 13 cm., lata $1\frac{1}{2}$ mm. est; sed in exemplis (infra citatis Moseley, Reed, in ins. Juan Fernandez lectis) cæteris spicæ quoad latitudinem variabiles (a $1\frac{1}{2}$ usque ad 3 mm. latæ) inter *U. Douglasii* typ. et *U. maclovianam* intermediæ videntur. Nux ea *U. gracilis* paullo angustior, sed in exemplis obviis non bene maturata.

Ins. Juan Fernandez (*Douglas; Reed; Moseley*). Ins. Masafuera (*Leyboldt*).

Sect. 3. Pseudocarex. Spiculæ androgynæ, fructu deflexæ. Seta rigida, teres, utriculum longe superans, quoad structuram situmque omnino *Unciniæ*, sed apice non aut minutissime uncinata.

25. U. microglochin (*Spreng. Syst.* iii. p. 830): stolonifera, erecta, debilis, glabra; foliis canaliculato-complicatis; spicis longis 1 cm., densis; utriculis anguste lanceolatis; nuce elliptico-oblonga, obtusa, stylobasi lineari.—U. europæa, *J. Gay in Flora*, 1827, p. 28.—Carex microglochin, *Wahl. in Kong. Akad. Handl. Stockholm* (1803), p. 140, *Fl. Lapp.* p. 224; *Schkuhr, Carex*, ii. p. 22, tab. Ssss. fig. 210; *Fl. Dan.* tab. 1402?; *Svensk. Bot.* tab. 539. fig. B; *Hoppe in Sturm, Fl. Deutsch.* vii. tab. 69; *Dewey in Sillim. Amer. Journ.* (1848) p. 174; *Reich.*

Cyper. p. 3, tab. 196; *Anderss. Cyper. Scand.* p. 74, tab. 3. fig. 1; *Bœck. in Linnæa,* xxxix. p. 32; *Frœl. Alp.* fasc. 3, tab. 7.—C. oligantha, *Boott, Carex,* iv. p. 174, tab. 589.

Culmi 1 dm., aut in exemplis Himalaicis usque ad 3 dm. attingentes, stricti, subteretes, striati, non scabridi, basin versus plurifoliati. Folia culmis multo breviora. Spicæ floriferæ latæ vix 2 mm., densæ, bracteis imbricatis, fructiferæ utriculis acutissimis deflexis subspinulosæ. Bracteæ longæ 3 mm., ellipticæ, obtusæ, stramineo-fuscæ, in marginibus scariosæ, deciduæ. Utriculi longi 3 mm., lati $\frac{2}{3}$ mm., plano-convexi, teretes, læves, apice admodum acuti nec rostrati. Stigmata 3. Seta longa 4–5 mm., apice recta aut minute uncinata. Nux lævis, utriculo multo brevior.—Seta interdum non minus hamata quam in *U. Kingii.*

Europa, in arcticis et alpinis frequens, a Lapponia usque ad Alpes. Grœnland. Dahuria. Mts. Attai. Mts. Himalaya: in provinciis occidentalibus, Kashmir, Balti, &c., alt. 4000–5000 metr. frequens (*Jacquemont,* n. 485; *T. Thomson, &c.*). America australis: Fuegia (*Capt. Wilkes*); Portus Gallant (*Cunningham*).

Species mihi ignotæ.

26. U. MONTANA (*Philippi*; *Bœck. in Linnæa,* xli. p. 345): "culmis 5–3 poll. alt. filiformibus; foliis culmo multo brevioribus, rigidis, canaliculato-complicatis; spica lineari, densiflora, longa 10–8 lin., lata $1\frac{1}{4}$ lin.; bracteis parvis, orbiculato-ovatis; utriculis bractea multo longioribus, oblongo-ovalibus, apice leviter attenuatis, margine dense setuloso-ciliatis.

"Rhizoma elongatum, repens. Folia longa 2–3 poll., lata 1–$\frac{1}{2}$ lin. Bracteæ conformes, rigidulæ, basi amplectentes, obsolete striatæ, sordide flavæ, infra marginem anguste scariosum zona fusco-ferruginea notatæ. Setæ bracteis duplo longiores."

Chili (*fide Bœckeler*).

27. U. MACROLEPIS (*Decne. et Hombron in D'Urville, Voy. au Pôle Sud,* p. 3, tab. 6. fig. A): "culmo basi tantum foliato, culmis breviore; spica densiflora, longa 6 lin. et ultra, lata 2 lin.; bracteis elliptico-ovatis; utriculis ovoideis, apice puberulis; nuce elliptica.

"Folia primum plicata, demum carinato-plana. Bractea ima aristata, cæteræ obtusiusculæ, muticæ. Utriculi hinc plani, illinc convexi. Setæ glabræ, utriculis plus quam duplo longiores."

Fretum Magellan (*fide Decaisne*).

Species a genere alienæ.

Uncinia nepalensis, *Nees, Cyper. Ind.* p. 129, est *Carex.*

Uncinia Selloviana, *Nees in Mart. Brasil.* (*Cyper.*), p. 201, est *Carex Selloviana*, Schldl.

Uncinia phyllostachya, *Nees in Mart. Brasil.* (*Cyper.*), p. 201, est *Carex.*

Uncinia phalaroides, *Nees in Mart. Brasil.* (*Cyper.*), p. 202, est *Carex phalaroides*, Kunth.

Uncinia Lehmanni, *Nees in Linnæa*, 10. p. 206, est *Schœnoxiphium? Lehmanni*, Kunth, *Carex Esenbeckiana*, Bœck.

Uncinia breviseta, *Torrey in Ann. Lyceum New York*, iii. p. 428, est *Carex filifolia*, R. Br.

Uncinia digyna, *Hochst., Steud. Syn. Cyper.* 244, est *Carex monostachya*, A. Rich.

Uncinia spartea, *Spreng. Syst.* iii. p. 830, est *Carex spartea*, Wahl.

Uncinia spartea, *Nees in Linnæa*, x. p. 205, est *Carex spartea*, Thunb. (*vide* Bœck.).

Uncinia Sprengelii, *Nees in Linnæa*, x. p. 205, est *Carex Sprengelii*, Bœck.

DESCRIPTION OF PLATE XXX.

Figs. 1, 2. *Carex uncinioides*, Boott. 1. Nut with rudiment, utricle removed. 2. Ground-plan of a female flower, to show the oblique position of the rudiment.

Figs. 3, 4. *Hemicarex Hookeri*, Benth. 3. Summit of culm, about natural size. 4. One female spikelet, in ripe fruit.

Figs. 5, 6. *Hemicarex laxa*, Benth. 5. Spike (from about middle of inflorescence), about natural size. 6. Female spikelet, nut nearly ripe.

Fig. 7. *Kobresia nitens*, C. B. Clarke. Androgynous (complete) spikelet dissected out.

Fig. 8. *Schœnoxiphium Burkei*, C. B. Clarke. Androgynous spikelet (base only of the male part shown); consists of bract, glume to female, nut nearly ripe, winged 2-nerved rhachilla, and males above.

Figs. 9–11. *Schœnoxiphium Thunbergii*, Nees. 9. Androgynous spikelet. 10. Rhachilla and male flowers, the female glume and nut removed 11. Nut, with base of style.

Notes on some new Economic Products recently received at the Royal Gardens, Kew. By W. T. Thiselton Dyer, M.A., C.M.G., F.R.S., F.L.S., Assistant Director.

[Read June 21, 1883.]

The correspondence, official and otherwise, of the Royal Gardens, Kew, frequently brings under the notice of the staff new economic products of the vegetable kingdom of more or less interest, or at any rate cases in which fresh light is thrown upon those of which the origin is somewhat obscure. The Fellows of the Linnean Society are scattered so widely over British possessions in different parts of the world that I cannot but think that brief notes upon such matters would frequently be read by them with interest, and might, indeed, lead to the acquisition of further information of the same sort. Many such notices have been included in the annual issues of the Report of the Royal Gardens for some years past. But such a publication is obviously unsuited for more than the briefest record of ascertained facts. I therefore venture to hope that the following Notes (which may be followed from time to time by others of a similar kind) may be deemed worthy of a place in the Society's Journal.

1. *West-African Indigo.*

It has long been known from the observations of travellers that the natives of the west coast of Africa obtained an abundant supply of indigo from plants cultivated for the purpose. And as the species of the genus *Indigofera* have their head quarters in the African continent, it was not perhaps an unreasonable supposition that one or more of them was the source of the dye in use amongst the inhabitants of the west coast.

It was therefore with some surprise that I found amongst a number of specimens received at the close of last year from Captain Alfred Moloney, C.M.G., Administrator of the Gold Coast colony, a specimen of an arborescent leguminous plant, but obviously not an *Indigofera*, marked as yielding a native indigo. I drew Captain Moloney's attention to the interest attaching to the matter; and as the specimens received consisted merely of foliage, I urged him to secure additional material, sufficient for a botanical determination. He replied to me, on April 10, from Lagos, as follows:—"I am glad to find I have sharpened your appetite as to the indigo. The country abounds with it; but as the young shoots are the parts from which the dye is made, you can realize the difficulty of securing flower and fruit. I don't despair, however . . . This tree might be largely developed here. It is a climber, and must be leguminous. The Yoruba for the tree is 'Elu.'"

I placed Captain Moloney's material, such as it was, in the hands of my colleague, Professor Oliver, who unites to a knowledge of the affinities of plants, which has become almost an instinct, an acquaintance with the contents of the vast Kew Herbarium in which it is safe to say that no human being will ever surpass him. He speedily drew my attention to a specimen (3360), brought back from the Niger expedition by Barter in 1859. It is accompanied by a manuscript note, which I transcribe:—

"Indigo of the Yoruba country. Leguminous shrub of twining habit and large growth. Flowers in loose panicles, at first pink, changing to a faded blue. Common near rivers; plantations of several hundred acres of this are about Abbeokuta. In cultivation the plant is kept about 7 or 8 feet high; long shoots are cut close, and it becomes short and spurred and bushy like *Wistaria sinensis* when similarly treated. The leaves are gathered young (as seen in specimen), merely powdered in a mortar into a black pasty state, made into balls the size of double fists, and dried for the markets. In dyeing, one ball to a gallon of water is used; the cloth allowed to remain 4 days. The dye is fixed with potash; a fine deep blue is produced, very permanent."

In a later communication (April 23) from Captain Moloney I received a supply of fruit of the plant with the following note:—"I send you some seed of the Yoruba indigo. It is a *leguminosa*, as I had imagined. I am promised flowers later, but I doubt, as I now get fruits, whether flowers will this year be forthcoming."

These fruits, Prof. Oliver was so good as to point out to me, were identical with those of a plant collected on the Old Calabar river by Gustav Mann (2280). Of this the Kew Herbarium does not possess the flowering state; but Mr. Bentham has conjecturally referred the species to *Lonchocarpus*; and it is probable that it may turn out to be closely allied to *L. cyanes-*

cens, Benth., a species not uncommon in the Upper Guinea district of Oliver's 'Flora of Tropical Africa.' Barter in fact remarks of this, in a manuscript note accompanying a specimen (1593) in the Kew Herbarium, collected at Nupe on the Niger:—"Yields a blue dye, which is used in the lower parts of the river."

Captain Moloney has recently returned to England on leave. He brought with him a selected sample of Yoruba indigo, which he presented to the Kew Museum. A portion of this I submitted to Dr. Hugo Müller, F.R.S., Foreign Secretary to the Chemical Society, who is well acquainted with the commercial value of indigo samples. He very kindly examined the Yoruba indigo, and informs me that it is worth from 4*s*. to 4*s*. 6*d*. per lb., as compared with fine Bengal, which is worth from 7*s*. to 7*s*. 6*d*. per lb. It contained, however, a good deal of earthy matter; and if this could be eliminated in the manufacture, it would of course be worth more. Captain Moloney tells me that the indigo is prepared by pounding the leaves in a mortar, and then soaking them in a pot containing 14 or 15 gallons of water; the dye subsides to the bottom.

2. *Inhambane Copal.*

The history of East-African or Zanzibar copal, the produce of *Trachylobium Hornemannianum*, Hayne, has been so thoroughly ascertained by Sir John Kirk*, that it seemed scarcely probable that East Tropical Africa would yield another somewhat similar but distinct product.

In the course of last year, however, we received from the Foreign Office a copy of a despatch (dated June 11, 1882) to the Secretary of State from Mr. Henry G. O'Neill, H.M. Consul for Mozambique. I extract the following passages from it †.

"I have the honour to report that from Mr. James Heathcote, of Inhambane (the trader that was employed by me for the recovery of the body of the late Captain Wybrants), I have received information of the discovery of a considerable tract of copal-forest, which, if it should turn out to be as rich as he anticipates, will add a valuable export to the trade of that place.

"He had just returned from an expedition to the interior, and writes, 'the forest where I obtained this gum, of which I send you specimens (I have collected 6 tons), is fully 200 miles long. It is a belt which runs parallel with the coast, and is midway between the coast and the first range of mountains; from Inhambane it is nearly 100 miles to get right into it. The distance of the forest from Inhambane may retard its being opened up; but its discovery adds to the known wealth of the district, and a new export to the place.' Mr. Heathcote further adds :—'The native name of the gum is *Stakate* and *Staka*; the Zulu name for the gum is *Inthlaka* . . . . The tree domineers over all. The gum has a beautiful odour if pounded and burnt, also if boiled in a pot of water.' The ordinary gum-copal tree of the mainland of Zanzibar and Mozambique, though, as a rule, lofty, is by no means of the striking stature indicated by Mr. Heathcote."

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* Journ. Linn. Soc. Botany, vol. xi. pp. 1–4 and 479–481, xv. pp. 234–235.

† Some extracts from Consul O'Neill's despatch appeared in 'Nature' for Aug. 10, 1882, p. 351; but I reproduce the substance here in order to make the whole account complete.

The first thing that struck us from a superficial examination of the specimens sent by Mr. O'Neill was that they were entirely different in appearance to ordinary East-African copal, such as is exported from Zanzibar. They consisted in part of water-worn pebbles, and very much resembled the Accra copal* which is exported from the west coast of Africa. They are destitute of the characteristic goose-skin texture frequently observed in Zanzibar copal and, as Sir John Kirk informs me, possess an entirely different odour.

That the product was not identical with Zanzibar copal was further established by a report with which Messrs. Robert Ingham Clark and Co., the well-known varnish-makers of West-Ham Abbey, very kindly furnished us, upon some of the specimens which we sent to them for examination. After pointing out the resemblance to Accra copal, they continue :—"They [the specimens] contain (some more than others) a considerable quantity of essential oil and have an average melting-point of 337° Fahr. This is not high, and we consider that they are a semi-fossil exudation. It is extremely difficult to give an exact commercial value to them; but as they *now* are, and mixing them together to represent one bulk, we should say their value would be about £80 to £100 a ton . . . . Certain descriptions of Animi shipped in a very clean and picked state from Zanzibar sell, in this market, as high as £400 a ton."

With a further despatch, dated Feb. 14, 1883, Consul O'Neill sent samples of the leaves and bark of the tree yielding Inhambane copal. Supposing that Consul O'Neill's collectors have made no mistake in the identification, Professor Oliver, the Keeper of the Kew Herbarium, was satisfied that the leaves afforded sufficient data to fix the species as *Copaifera Gorskiana*, Benth. Although it is stated in the 'Flora of Tropical Africa' (vol. ii. p. 315), on the authority of Sir John Kirk, that this tree affords a good hard timber, it was not known before that it yielded a copal suitable for commercial purposes.

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* An interesting paper by Dr. Welwitsch on W.-African Copals, in Journ. Linn. Soc. Bot. ix. pp. 287–302, may be consulted; it does not, however, carry our knowledge very far.

The identification is the more interesting on account of the resemblance of Inhambane to Accra copal. The latter has long been suspected to be produced by a species of *Copaifera*. Sierra-Leone copal is ascertained to be derived from *Copaifera Guibourtiana*, Benth. Students of tropical African botany are familiar with the occurrence of the same genera and even species on both the east and west coasts. *Landolphia florida*, one of the African rubber-vines, is a striking example of this wide distribution.

3. *Ogea Gum.*

This is a substance about which Captain Moloney wrote to me from Lagos (April 10, 1883):—"I fancy we have here a valuable copal. I am very desirous to promote conservancy of the tree producing it, and develop it into another industry and consequent export. The tree from which this is obtained is called in Yoruba 'Ogea,' and is mercilessly used at present, natives attaching no value to it. I send a specimen of the leaf, wood, fruit, and flower, and some of the copal. Any quantity of seed should be procurable here for development elsewhere. Notice the fruit, and that the copal burns readily; in fact it is used by the natives for fires and for light. Women use it powdered on the body as a perfume. Notice the boring also of the tree by a grub, which would seem to be a provision of nature; for out of the boring exudes the juice. I send also a black specimen, which seems to be affected or decomposed by the swamp from which I have had it dug. The favourite habitat of the Ogea-tree seems to be swamp-land."

Professor Oliver reported upon the specimens that the tree was a *Daniellia*, though the material was scarcely adequate for fixing the species. But it seemed not to be *D. thurifera* (Bennett in Pharm. Journ. 1855, xiv. p. 252), the frankincensetree of Sierra Leone. The product is apparently too unfamiliar to commercial men to enable any positive opinion to be expressed as to whether Ogea gum will be useful to the manufacturer or not. But it is thought not to be without promise for the purpose of varnish-making.

4. *Bhaib* (Pollinia eriopoda, *Hance*).

In 1879 Mr. Duthie, the Superintendent of the Government Botanical Garden, Saharunpore, wrote to Kew:—"I am sending by this mail a specimen of a Cyperaceous-looking plant which I have been asked to identify. It is a native of the Nepal Terai, and the district of Gorakhpur, at the extreme east of these provinces. Its native name is *Bankas*; it is largely used for making ropes &c. It has been sent to me three times, but on each occasion without flowers. It is said to flower only once in three years."

The specimens sent afforded no clue except to an expert in grasses. We therefore forwarded them to the well-known authority, the late Major-General Munro, C.B., whose knowledge of the family was remarkably minute. He promptly identified the plant with *Spodiopogon angustifolius* (Trin. in Act. Petrop. vi, ii. p. 300; Spec. Gram. t. 336). He added:—"It is *Andropogon involutus*, Steudel, and *A. notopogon*, Nees and Steudel. It is mentioned by name only as *Spodiopogon laniger* in Royle's 'Illustrations' (p. 416). It is very common in all parts of the Lower Himalayas; and I have also seen it from Afghanistan, collected by Griffith."

Beside rope, Bhaib grass is used for the manufacture of string matting and a variety of other articles, of which a collection was sent to the Kew Museum in 1880 by Mr. Duthie (see 'Kew Report,' 1880, p. 60).

This grass, Dr. Brandis, late Inspector-General of Forests to the Government of India, has pointed out to us, is identical with the *Eriophorum comosum*, noticed in the 'Kew Report' for 1878 (p. 45) as a possible paper-material; and he has been so good as to refer us to the following published note of his on the subject:—

"The export of the grass known as Bhabar, Bhaib, Bankas (*Andropogon involutus*, not, as has often been erroneously stated, *Eriophorum comosum*), from the Siwálik hills and from tracts of broken raviny ground outside the hills, is very considerable from nearly all parts of the forest treated in this Report. The grass grows abundantly on dry bare slopes; and no apprehension regarding the sufficiency of the supply need at present be entertained. It is used chiefly for rope-making; and it is by no means impossible that the establishment of paper-mills in North India will eventually lead to the employment of this grass for the manufacture of paper "*.

Specimens contained in the economico-botanical collections removed to Kew from the India Museum showed that the identification was, no doubt, accurate. The error seems to have gone back to Royle's 'Illustrations,' where the following statement occurs (p. 415):—"*Eriophorum comosum*, Wall., *cannabinum*, nob., "*bhabar*" of the natives, of which the leaves, previous to the plant flowering, are, in the Himalayas, extensively used for rope-making." Dr. Brandis informs me that the confusion between the two plants is accounted for by the fact that they both have a similar habit, and grow intermixed.

It may be convenient to reproduce here what is stated in the Kew Report' for 1878 (p. 45):—"*Eriophorum comosum*.—This plant is well known in North-western India, where, under the name of *bhabar ghas*, it is largely used as a material for ropes. It was submitted by Dr. King to Mr. Routledge, who writes to us:—'A small quantity of bleach brings it up to a good colour. The ultimate fibre is very fine and delicate, rather more so than Esparto, and of about the same strength; the yield, however, is 42 per cent., somewhat less. I think I may venture to say it will make a quality of paper equal to Esparto.'"

The history of the plant's vicissitudes is not, however, quite complete. In 1866 Dr. Hance described† a grass collected by Swinhoe in 1865, "Ad Apes' Hill insulæ Formosæ," as *Pollinia eriopoda*. Mr. C. B. Clarke has identified a specimen of this, which Dr. Hance was so good as to communicate to the Kew Herbarium, as *Spodiopogon angustifolius*. As Mr. Bentham has sustained (Gen. Pl. iii. p. 1127) the generic position assigned to the grass by Dr. Hance, though the latter botanist was apparently ignorant of what had been previously written about it, *Pollinia eriopoda*, Hance, is the name by which it must in future be known.

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* 'Suggestions regarding Forest Administration in the N.W. Provinces and Oudh,' by D. Brandis, F.R.S., C.I.E. (Calcutta, 1882, pp. 7–8).

† Journ. of Bot. 1866, p. 173.

5. *Wax from* Rhus vernicifera, *Dec.*

Up till quite recently extremely little has been known as to the details of the lacquer industry of Japan. The Kew Museum did not contain a single specimen illustrative of it, or of any thing belonging to *Rhus vernicifera*, Dec. which yields the peculiar varnish-like substance which is the foundation of lacquer.

In order to remedy this defect, application was made to the Foreign Office for the assistance in the matter of H.M.'s Legation in Japan. The result was the formation and despatch to this country of the most complete collection illustrative of the products of the Japan varnish-tree, and of the Japanese lacquer industry, which has probably ever been got together. For this excellent piece of work the greatest credit is due to Mr. J. J. Quin, H.M. Acting-Consul at Hakodate, who further enhanced the value of the collection by a minute and valuable Report on the whole subject, which is printed amongst the Foreign Office Blue-books*.

From this Report, which, although it will always be a standard authority for reference on the subject, will probably find its way into the hands of but few botanists, I extract the following passage descriptive of the conditions under which *Rhus vernicifera* grows in Japan:—

"The *Rhus vernicifera*, the well-known lacquer-tree of Japan, is met with all over the main island, and also in smaller quantities in Kiushiu and Shikoku; but it is from Tôkiô northwards that it principally flourishes, growing freely on mountains as in the plains, thus indicating that a moderate climate suits the tree better than a very warm one. Since early days the cultivation of the tree has been encouraged by the government; and as the lacquer industry increased, plantations were made in every province and district. The lacquer-tree can be propagated by seed sown at the end of January or the beginning of February. The first year the seedlings reach a height of from 10 inches to 1 foot. The following spring the young trees are transplanted about 6 feet apart; and in ten years an average tree should be 10 feet high, the diameter of its trunk 2½ to 3 inches, and its yield of lacquer sufficient to fill a 3-ounce bottle.

"A more speedy method is, however, generally adopted. The roots of a vigorous young tree are taken, and pieces 6 inches long and the thickness of a finger are planted out in a slanting direction a few inches apart, 1 inch being left exposed above the ground. This takes place in the end of February and through March, according to the climate of the locality. These cuttings throw a strong shoot of from 18 to 20 inches the first year, and are likewise planted out the following spring. Under equally favourable circumstances these trees would in ten years be nearly 25 per cent. larger in growth, some 2 or 3 feet higher, and would yield nearly half as much more sap than the trees raised from seed.

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* Japan, No. 2 (1882).

"It has not hitherto been the custom to bestow any special care on the trees after planting them out; but in cases where leaf or other manure has been applied they are much finer. Of late years hill-sides and waste grounds alone have been used for lacquer plantations, as, owing to the rise in the price of cereals and farm-produce generally, it does not pay the farmers to have their land cumbered with trees" (pp. 2, 3).

In a further passage Mr. Quin describes the manufacture of wax from the berries. Such a product is, as far as I can ascertain, little known in Europe, though, of course, Japan wax (the produce of *Rhus succedanea*, L.) is a substance which has been a good deal studied, and was at one time, at any rate, a considerable article of trade. Simmonds * merely remarks that "the lacquer-tree also yields the wax;" and this is the only reference to it I have met with.

"In the northern provinces very old and large trees are met with in considerable quantities. These were kept for the sake of their berries, from which the wax used for the Japanese candles was obtained. This was the more profitable use to which to put the tree, as a good tree, from 80 to 100 years old, yielded yearly, on an average, equal to 6*s*., while the price of a ten-year-old tree to be used for extracting the sap was under ½*d*. Previous to the revolution of 1868 every tree reserved for making wax was officially registered, and the owner was not allowed to mutilate it in any way. Even if a tree died, he had to get official permission before removing the stump. The Shogun's Government and also the local magnates had large plantations of the lacquer-tree reserved for wax; but since the opening of the country to foreign trade, and the introduction from abroad of kerosine oil, the wax industry has greatly declined, and there are now no restrictions on the free sale of the tree for tapping, and consequently all the fine old trees (which will sell for from 5 to 6 yen) are fast disappearing" (p. 5).

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* 'Tropical Agriculture,' 1877, p. 421.

I wrote to Mr. Quin asking him to be so good as to add to his other services that of procuring for the Kew Museum specimens of the wax alluded to in the foregoing extract from his report. These he obtained for us, and he also sent, through the Foreign Office, the following additional information about the substance itself (Tokio, March 22, 1883):—

"I have also procured wax made from the berries of the *Rhus vernicifera*, in the prefecture of Awomori, and some made in the district of Aidzu, together with candles made from it. The wax being used locally has not been refined; but I am assured that the quality of the wax is equal, if not superior, to that made from the berries of the *Rhus succedanea*. In the N. part of the main island the *Rhus succedanea* does not thrive, though the severe climate does not appear to affect the lacquer-tree where it abounds in the province of Tsugaru.

"As stated in my report on the lacquer industry of Japan of last year, the production of wax from the berries of the *Rhus vernicifera*, owing to the introduction of kerosine oil and the gradual destruction of the old trees, has greatly decreased, and doubtless in a few years will have almost ceased. Even at the present time the wax produced in the N. does not suffice for the local consumption, the deficiency being supplied by wax from the S. Provinces, made from the berries of the *Rhus succedanea*."

6. Myrica-*wax from Jamaica.*

Various species of *Myrica* yield a wax in different parts of the world. The berries are simply boiled, and the wax rising to the surface is skimmed off and moulded into cakes. Mixed with tallow, the wax of *Myrica cordifolia*, L., is used at the Cape in candle-making. *M. cerifera*, L., yields a similar product in N. America, and a variety of species are utilized in a similar way in Central America.

The Kew Museum possesses a candle of *Myrica*-wax from the "W. Indies," presented by Professor Ansted, and a moulded block of what is probably a similar material from St. Domingo. For the first authentic sample from these islands we are, however, indebted to D. Morris, Esq., F.L.S., Director of Public Gardens and Plantations, Jamaica. The following particulars respecting it were contained in a letter dated March 15, 1883:—

"I am sending in a separate parcel a small specimen of wax prepared by Mr. Hart from one of our native trees, which may be of sufficient interest to have a place in your Museum. It has been prepared from the seeds of *Myrica microcarpa*, Benth., an amentaceous plant, growing abundantly on the hills of Jamaica at elevations of about 5000 feet. The seeds were simply boiled with water for about half an hour, and then allowed to cool, the wax forming (when cool) a cake on the surface of the water. This was melted again in an earthen vessel to allow the dross to settle to the bottom, after which the wax becomes clean and clear."

As the tree is very abundant in Jamaica, and is of no use except for fire-wood, it would be a very desirable thing if any commercial use could be found for the wax, as it can be prepared in such an exceedingly simple manner.

7. Trapa verbanensis, *De Notaris.*

During a recent visit to Italy I was shown, at Pallanza on the Lago Maggiore, handsome rosaries made of the fruits of a *Trapa.* They undoubtedly belonged to the form of *Trapa natans* described by De Notaris* as *Trapa verbanensis*, the specific name being derived from the old name, Verbano, of the Lago Maggiore. Specimens of the form have been distributed by Alessio Malinverni in Bænitz's 'Herbarium Europæum.' This collector states that it is abundant in the Lago Maggiore, ripening its characteristic fruits by October. Sir George MacLeay, F.L.S., however, informs me that the fruits (known locally as "*frutti di lago*") used for the manufacture of the rosaries are obtained from the Lago di Varese.

8. *Ngai Camphor.*

In looking through the report by Mr. A. Frater, H.M. Consul at Kiungchow, on the trade of that port during 1881 (March 3, 1882), I observed that mention was made of "prepared *Artemisia moxa* (for the manufacture of Indian ink)" as a principal export from Chia-chik †. Mr. Frater was good enough, on application, to send us a specimen, and it turned out to be not, as we had expected, the plant in some dried state, but a camphor-like substance, which revealed nothing as to its origin.

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* Memoria letta alla Reale Accademia dei Lincei: Roma, 1876.

† 'Commercial Reports by Her Majesty's Consuls in China,' 1881, pt. 1, p. 67.

The explanation is, no doubt, to be found in a passage in Hanbury's 'Science Papers' (p. 393), who quotes from Rondot[*]:—"There exists also another sort of camphor, extremely white, which is extracted from the leaves of a plant known in China under the name of *Ngai*, a variety of *Artemisia*." Substantially the same account is given by Porter Smith[†]. Hanbury further adds (p. 395):—"The camphor is used not only in medicine, but also in the manufacture of the scented kinds of Chinese ink."

The specimen sent by Mr. Frater is not white, but greenish grey, which may be due to defective purification. I can, however, scarcely doubt that it is identical with Ngai camphor, of which a specimen previously existed in the Kew Museum; this Hanbury attributes to *Blumea balsamifera*, DC.

It is interesting to notice that, according to Kurz ('Forest Flora of British Burma,' vol. ii. pp. 82, 83), *Blumea balsamifera* is abundant in our Indian possessions. He describes it as "an evergreen shrub, sometimes growing out into a small tree." He further remarks:—"A most common and troublesome weed, freely springing up in deserted toungyas and savannahs, along river-sides, &c. all over Burmah, up to 3000 feet elevation ..... Yields camphor equal to the Chinese one."

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[*] 'Etude pratique du commerce d'exportation de la Chine' (Paris, 1848).

[†] 'Contributions towards the Materia Medica and Natural History of China,' 1871, p. 25.

Description of a new Species of *Pandanus*, as a Note to Mr. J. G. Baker's Paper on the Flora of Fiji. By Prof. I. BAYLEY BALFOUR, D.Sc., F.L.S.

[See page 359.]

PANDANUS JOSKEI (*J. Horne in 'A Year in Fiji,'* p. 265).

Arborescens erecta, foliis acuminatis reduplicatis basi grosse apice tenuiter aculeatis, syncarpiis ovoideis v. conoideis magnis solitariis axillaribus ad truncos infrafoliaceis longe pedunculatis, bracteis plurimis acuminatis, drupis anguste obcuneatis 4–6-angulatis apice planis v. concavis stigmate auriculato, 1-spermis.

An arborescent erect plant 20 feet or more high; stem dark-coloured, rough. Leaves often 12 ft. long, 6 to 8 in. broad, acuminate, reduplicate; margin coarsely at the base, at the apex finely prickled. Fruit-heads ovoid or cone-shaped, 6–8 in. long, 4–6 in. diam., often as much as 1 ft. long and 10 in. diam.; solitary, axillary, erect, in spirals around the stem below and amongst the leaves. Peduncles $\frac{1}{2}$–1 ft. long. Bracts many, ovate acuminate, subulate at point, the larger 1 ft. long, the smaller ensiform and very short. Drupes narrowly cuneate downwards, 1-seeded, fleshy, 4–6-angled, $2\frac{1}{2}$ in. long, $\frac{1}{4}$ in. diam. below, $\frac{1}{2}$–$\frac{3}{4}$ in. diam. above. Apex flat and concave, with an auriculate stigma. Seed $\frac{1}{2}$ in. long, $\frac{1}{8}$ in. diam.

Fiji. Common between the Wai Manu and the Reiva river on alluvial land; also in damp spots near streams in the mountains at the sources of the Tamarina river between Suva and the Reiva river.

Distrib. Endemic.

The description of the foregoing is derived from a note, accompanied with a rough sketch of this Screw-Pine, sent me in 1879 by Mr. Horne. The details are rather meagre, and I have seen no specimens, as Mr. Horne brought home none. He remarks it is in some respects allied to *P. Iceryi*, Horne, a Mauritian species; but the resemblance lies only in the non-branching stem with infrafoliaceous and interfoliaceous fruit-heads. It is, I believe, a good species and a new one, and belongs apparently to the *Vinsonia* section of the genus.

Alnus Richardsoni (*Petrophiloides*, Bowerbank), a Fossil Fruit from the London Clay of Herne Bay.

By J. STARKIE GARDNER, F.G.S. (Communicated by E. T. GARDNER, F.L.S.)

[Read November 1, 1883.]

(PLATE XXXI.)

THE subject will scarcely, I fear, appear of sufficient importance to justify the presentation of a separate paper upon it; but the species has been described by Bowerbank, examined and written upon by Mr. Carruthers, Baron von Ettingshausen, and criticised by nearly every author who has written upon the fossil plants of the Tertiary formation. I feel some diffidence, therefore, in proposing to remove it to a totally different family from that in which so many authorities have concurred to place it; and the more so, as I believe that I am thereby removing the only fruit yet ascribed to the Proteaceæ from our British Eocenes, although so many of these deposits contain foliage which it is apparently hard to assign to any other family.

The fossil in question is a small fruit or cone from the London Clay, and is one of the most beautiful and best known of British Eocene fossils. Two figures of it grace the wrapper of Bowerbank's 'Fossil Fruits and Seeds of the London Clay,' and its attractive form has led to its illustration in tables of British fossils and in text-books. It is referred to in almost every work treating in general of British Tertiary Geology, and in many of the works on Tertiary plants that have been published abroad. Though generally spoken of as a "Sheppey fruit," it is only met with washed out by the sea from the London Clay of Swale Cliff near Herne Bay; and though far from an abundant fossil, it has been so sought by collectors, that Bowerbank's collection contained nearly three hundred specimens, and I have since brought together a scarcely inferior quantity. Rarely, however, has the true nature of so attractive a fossil been so long misunderstood; and this is the more surprising, as perhaps few have been so frequently examined by botanists.

I am not sure whether it was noticed by any writers previous to the publication of Bowerbank's work in 1840*; but in that year the cones were minutely described and several specimens carefully figured. The author at first considered them to be allied to *Casuarina*; but subsequently Dr. R. Brown suggested to him that their affinities were rather with the Australian Proteaceous genera *Petrophila* and *Leucodendron*; and the genus *Petrophiloides* was consequently founded to receive them. The scales were thought to be confluent, surrounding "deep cells with semicircular mouths," or "empty cells remaining after the operation of dehiscence"[*]; but these cells are actually cavities left by the decay and removal of the true scales of the cone, while the supposed scales are amorphous pyrites which has infiltrated into the interstices and enveloped the seeds. The form of the seed could not, however, be assimilated with that of any of the Proteaceæ; and it is certainly strange that the minute examination they were subjected to did not lead to a better apprehension of their true structure. Denuded axes of the cone led to the foundation of other, and seedless species. In 1851, Ettingshausen[†], believing he had found the same species at Monte Promina, revised Bowerbank's work, and pointed out that five of the supposed species from Sheppey were specimens of the same in different states of preservation. This view was endorsed by Schimper[‡] and subsequent authors.

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* 'The Fossil Fruits and Seeds of the London Clay.'

In 1871 Lyell had occasion to figure them, and submitted them to Carruthers, who confirmed Robert Brown's view as to their Proteaceous origin[§]. Their determination remained, in fact, unchallenged until 1879, when Ettingshausen transferred them to *Sequoia*, changing the specific name to *S. Bowerbankii*; but since no reference to it or description occurs in the text, it is impossible to appreciate the motives which induced the transfer[‖]; and I believe the Professor is now inclined to agree in their reference to *Alnus*. Finally, Saporta, to whom I sent specimens, without committing himself to any decided opinion, counselled me to compare them with *Dammara*. Although I felt that all these references were unsatisfactory, and had decided to omit the species from the Palæontographical Society's work on the Eocene Coniferæ of Great Britain, I can claim no particular credit in the matter; for it did not occur to me to compare them with *Alnus* until I had dissected some cones which I happened to pick up in Kew Gardens.

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[*] *L. c.* p. 45.

[†] 'Der Eocene-Flora von Monte Promina,' p. 17.

[‡] Schimper, 'Pal. Végétale,' vol. ii. p. 784.

[§] 'Student's Elements,' Lyell, 1871, p. 240. "Carruthers having examined them, tells me that all these cones from Sheppey may be reduced to two species, which have an undoubted affinity to the two Australian genera above mentioned; although their perfect identity in structure cannot be made out."

[‖] Proc. Roy. Soc. 1879.

The cones measure from 12 to 35 millim. in length, and average 15 millim. in diameter; and are so seldom crushed in fossilization, that their original form is almost perfectly preserved. In shape they are ovately cylindrical, obtusely ovate to subglobose, and shortly stalked. The axis is cylindrical or subovate, with sunk lozenge-shaped scars with raised edges and a raised central umbo. The scales are in 8 rows, the rows consisting each of about 16, persistent to and at nearly right angles to the axis, thin, ligneous, hollowed out on the upper surface to receive the seed, grooved or striated longitudinally on both sides (Pl. XXXI. fig. 18), and with slightly thickened, recurved, and rugged or crenulated (?) apex (fig. 20, *a*). The seeds occur singly under each scale, and measure 5 millim. in length, 3 millim. in breadth, and about 2½ millim. from face to face. They are grooved centrally on both faces, especially towards the base, the margins slightly winged, the surface striated, the apex pointed, and the base truncated.

They bear a strong superficial resemblance to cones of *Alnus glutinosa*, and have many points of structure in common. They are equally variable in form and size (figs. 1–8); and are liable to distortion, a specimen (fig. 9) having its scales on one side puckered and converging, and another (fig. 10) having the stem grown quite through. These peculiarities would of course in no way preclude the reference of the species to the Coniferæ or Proteaceæ; but still they are more commonly seen in *Alnus*. The scales are in 8 rows instead of 5 as in the living species; though there are approximately the same number in each spiral, giving the cone a more crowded and compact appearance, and forming a richer rosette at the apex and base (figs. 11 and 12).

Portions of the stem are frequently attached, and these are not only grooved externally, as is frequently the case in *Alnus glutinosa*; but, as Bowerbank observed, do not present the slightest trace of the dotted ducts and structure peculiar to Coniferæ. The presence and character of this stem affords very strong evidence in favour of their reference to *Alnus*; for while cones of the Coniferæ are so easily detached that I know of no instance in which they have remained attached after floating about in sea-water long enough to have become imbedded and fossilized, the *Alnus*-cones are so adherent that it is impossible to break them from the branch without some part of the stem remaining attached. The pith-cavity of the stem, again, is almost always indicated in the fossil, and is marked by either a protuberance or depression, its different texture causing it to decay unequally on exposure. A section made by Bowerbank shows it very clearly (fig. 22).

The axis of the cone is cylindrical (fig. 21) or ovate (fig. 14), and is often exposed, and sometimes so completely denuded of scales as to have been described as a distinct fruit. It is covered with somewhat complex lozenge-shaped scars, marked out in part by the bases of the scales. The scars form depressed areas with raised margins and a central prominence or umbo, to which the seed was apparently socketed. The axis in *Alnus* is very similar externally, though the scars are rounded or pear-shaped; but it differs structurally, for the scale springs from the centre of the depressed area, and the seeds have no appearance of being socketed, but seem to have been produced on the raised and more pulpy margins of the scars. The scales of the cone are less pyritized than the interspaces, and have frequently decayed and left hollow spaces. Though these have been spoken of as cells with semicircular mouths, there is not the least doubt that the cavities are actually due to the decay of lignitic matter (which has to a large extent replaced the woody tissue of the scales) being more rapid when exposed to sea- and atmospheric action, than the solid pyrites which has infiltrated between them. The lignite, in fact, still exists in many specimens (fig. 20), and may be picked out with a needle, and one of the cavities thus immediately produced. The upper surface of the scale is hollowed and furrowed to receive and hold the seed, and the apophysis is thickened (fig. 20, *a*, *b*), and apparently may have been crenulated. It is doubtful, however, whether the actual apex has not been more or less abraded in all the specimens. In *Alnus glutinosa* the scale divides, and is composed at the apex of a bundle of tissue forming a loosely crenulated head; but it does not appear that the fossil scale was similarly formed. When, however, melted wax is allowed to fill the interstices of the recent cone (fig. 13), the resemblance to the fossil is considerably enhanced; for the scales then assume a more regular and compact appearance, and the likeness is still further increased if the apices are sliced away with a sharp knife, their thin crescentic outline becoming identical with the fossil, except that the ends point slightly downward instead of upward (fig. 13, basal part). The seed (fig. 23) is solitary, and is found enclosed in the solid pyrites between the scales. It is pointed at the apex, truncated at the base, slightly winged laterally, and is fashioned into two lobes by a deep groove which extends almost from top to bottom. When partly decayed, the apex falls away, and exposes what appears to be a smooth kernel with a blunted bilobed termination. These may frequently be seen projecting from the cones in certain stages of decay (fig. 8). The seeds are often exposed in transverse fractures (fig. 17), though the cones more frequently break in the line of the scales (fig. 18). The best way to obtain them is to leave the fruit in water for some time and then expose it to the air, when it crumbles up and, if not too far decayed, yields its seeds. In form and size the seed exactly resembles that of *Alnus glutinosa* (fig. 24), but possesses considerably more substance. In the latter the seeds are more numerous, three or four to each scale, and a large proportion are undeveloped; but in the fossil species each seed was protected by its scale and separately jointed to the axis, and a very large proportion relatively to *Alnus* seem fully developed. A generic distinction might possibly be based upon this character. Every cone that I have yet examined still retains its seeds, so that they were not shed till after the cones had fallen from the tree. I have, however, also found seeds in the cones of *Alnus* that I have picked up even late in winter. Yet, from all the peculiarities enumerated, it seems likely that they remained in the cone for a relatively much longer period, and did not become detached even after prolonged maceration in water. This is, however, only a matter of inference; for pine-cones that have gaped and shed their seed float for a much longer period than those which retain them; and we have thus in some fossil floras, as at Sheppey, only cones with seeds; and in others, as at Bracklesham, only cones without seeds. It is possible, therefore, that in this instance the spent cones may have similarly floated away to a greater distance; but I do not think it probable, for the presence of seed in *Alnus* does not imply much more sap in the tissue, and would not therefore greatly affect the specific gravity.

The relationship of our cone to *Alnus* appears obvious; and, indeed, the resemblance is so strong in many respects as to render its separation almost impossible. The chief difference lies in the seeding; but until there is an opportunity of dissecting cones of all the exotic species, it cannot be affirmed with certainty that any of the characters are confined to the fossil species. The moment the real nature of the supposed cells is admitted, the reference of the fossil to the Proteaceæ becomes difficult; and I can now see no resemblance in it either to fruits of *Petrophila* or *Isopogon*; and though it is hardly necessary to notice the fact, no leaves of either of these genera, so far as I know, have ever been recognized among European fossil plants. I have equally sought in vain for any analogous fruits among the true Coniferæ and the Cycads; *Larix*, *Dammara*, and *Cunninghamia* seem to approach it most nearly, but they possess no detailed structure in common. In like manner, its reference to *Sequoia* is incomprehensible; for besides the fact that the scales are ten times more numerous, there are absolutely no characters to justify it.

I am not yet able to give a list of the fossil species of *Alnus* from other deposits. Only one other occurs, so far as I know, in England, at Bournemouth; and this possesses very small cones, which were shed clustered together. Cones of nearly equal dimensions have been obtained from the Tertiaries of Koumi in Eubœa, from Aix in Provence, and from Antrim; and other species from Austria and Switzerland, which are compared with the existing *A. cordatum* and *A. orientalis*. Our London-Clay species is probably the oldest of which the fruit is known. It is an interesting circumstance that it is entirely confined to that part of the formation met with at Swale Cliff, Herne Bay, and which is below the horizon of the Sheppey fruits; and its absence from the later zones, considered with many other facts, tends to show that the maximum temperature was not reached till late, instead of at the commencement of the London-Clay period.

For the benefit of palæontologists who may consult this paper, it will be well to add that there are fourteen existing species of *Alnus*, which range through Europe, Central and Northern Asia, North America, and the Andes, with one outlying species in Africa. They thus inhabit temperate countries, and the association of their fruits in large quantities with the *Nipa* and other tropical vegetation of Sheppey would be as incongruous as it is untrue. The cones have often been taken to Folkestone for sale, and imbedded in Gault.

DESCRIPTION OF PLATE XXXI.

Fig. 1. Elongate form of *Alnus Richardsoni.*

Fig. 2. Average form, showing cavities left by removal of decayed scales.

Fig. 3. Example with scales partially remaining.

Fig. 4. Example showing blunt ends of seeds exposed.
Fig. 5. Small specimens with scales much decayed.
Fig. 6. Exceptionally small cone.
Fig. 7. Specimen showing scales completely decayed, but seeds remaining enveloped in pyrites.
Fig. 8. Cone showing divided scales with crenulated (?) apex and seeds exposed.
Fig. 9. Distorted cone; and Fig. 10, monstrous cone with stem growing quite through.
Fig. 11. Base of cone; and Fig. 12, apex of cone.
Fig. 13. Cone of recent *Alnus glutinosa*, imbedded in wax; the apices of the scales removed.
Fig. 14. Cone with axis exposed and showing scars.
Fig. 15. Longitudinal section through cone, showing position of scales and seeds.
Fig. 16. Longitudinal section through recent cone of *Alnus glutinosa*.
Fig. 17. Transverse section, showing seeds; and Fig. 18, transverse section, showing structure of scales.
Fig. 19. The same through a recent cone.
Fig. 20. Distorted cone showing apophyses of scales; 20*a*, scales, enlarged.
Fig. 21. Denuded axis of cone, showing scars of attachment of seeds and scales.
Fig. 22. Enlargement of stem, showing pith-cavity. From Bowerbank's 'Fossil Fruits and Seeds of the London Clay,' pl. ix. fig. 15*c*.
Figs. 23. Seed of *A. Richardsoni*; Fig. 24, seed of recent *A. glutinosa*.

All the fossil specimens from the London Clay of Swale Cliff, Herne Bay. Figs. 1–4, 11, 12, 17, 18, 21, 22, from the Bowerbank Collection in the British Museum; the remainder from the author's collection.

On the Origin of the Placentas in the Tribe Alsineæ of the Order Caryophylleæ. By Miss G. LISTER. (Communicated by ARTHUR LISTER, F.L.S.)

[Read November 1, 1883.]

(PLATES XXXII.–XXXV.)

THE mode of development of the capsule differs in the tribes Sileneæ and Alsineæ of the order Caryophylleæ.

The capsules of the Sileneæ develop in a way that leaves little doubt as to the carpellary origin of the ovules and placentas.

In the Alsineæ the carpellary origin of the ovules is much less apparent. The early stages of the growth of the capsule are here, at first sight, so different as to suggest the idea that the placentas are axial and not carpellary; but this view does not seem to be the true one.

The capsule of *Lychnis diurna*, a species which may be taken as a representative of the group Sileneæ, develops in the following manner (Plate XXXII.):—

In the female plant the central part of the very young flower is raised as a convex elevation above the staminal whorls when the latter have just appeared (though in this species they do not continue far in their development). Round the lower part of this elevation five prominences arise; these, the rudimentary carpels, grow up and coalesce in such a way as to form five broad pockets round the centre. The whole constitutes the rudimentary capsule, its wall and dissepiments (whose free upper edges are all on the same level) being formed by the carpels and their much inflexed margins (Pl. XXXII. figs. 2, 3).

When the whole has grown till the length of the capsule almost equals twice its breadth, the dissepiments no longer meet in the centre; they project above from the capsule walls as free plates of tissue. The upper part of the capsule then becomes narrower, its walls growing faster than the dissepiments; or, in other words, the outer parts of the carpellary leaves grow faster than their inflexed margins. The capsule finally closes in above, and the extremity of each carpel is continued upwards to form one of the five stigmas.

Before the mouth of the capsule has closed in, the ovules begin to appear, the upper ones developing first. They arise in the lower 5-locular part of the capsule in a double row from the inner side of each loculus, and in the upper unilocular part, from either side of the margins of the plates that project freely into the cavity of the capsule. From forty to sixty ovules are formed in each loculus (Pl. XXXII. figs. 7–9).

When the flower opens, the central axis is no longer united to the capsule-walls by the dissepiments except in its lower part and at the roof of the capsule; from this it is broken away after flowering, and the placentation then appears to be entirely free-central.

In the male flower of *Lychnis diurna* the carpellary whorl is not developed. Within the staminal whorls a column of tissue projects into the centre of the flower; this may be the elongated floral axis around which the carpellary leaves have not been formed. It often corresponds in length with that space in the capsule of the female flower extending from the base of the capsule to where the dissepiments become free. The length of this column, however, varies in different specimens; sometimes it is scarcely developed at all (Pl. XXXII. fig. 12).

In *Dianthus barbatus*, also a member of the group Sileneæ, the carpels rise higher above the apex of the axis before the ovules appear than in *Lychnis*; whereas in *Lychnis* only two pairs of ovules are developed on the free margins of each dissepiment; in *Dianthus barbatus* there are four pairs; and although the principle holds good that the ovules in the upper part of the capsule are the first to develop, it must be noted that the uppermost pair of ovules are always, so far as I have observed, later in development than the pair immediately below them. There is sometimes an indication of a similar tendency in *Lychnis*.

Sagina apetala is a member of the group Alsineæ, in which the development of the capsule resembles that of *Lychnis* extremely in its early growth, and does not differ from it much in its later stages (Pl. XXXIII. figs. 1–8). When the staminal whorl has appeared, the carpellary whorl arises as four blunt prominences round the base of the slight central elevation; these soon take the form of four shallow pockets. As the capsule increases in length, the pockets or loculi become deep and narrow in a radial direction, their upper edges keep almost on a level with the central elevation, and their four dissepiments nearly meet in a cross-like manner at its apex. This they surmount before the appearance of the ovules (Pl. XXXIII. figs. 4–7). Later, the capsule becomes narrower and closes over above; the walls of each loculus grow upwards to form one of the four stigmas. The lower part of the capsule is four-locular, and upper unilocular, being incompletely divided by the dissepiments. When the flower opens, the dissepiments have broken away from the lateral walls of the capsule, but remain adhering to its roof as four loose-tissued bands: these become detached during the further growth of the capsule after flowering (Pl. XXXIII. fig. 8).

The early stages of the development of the capsule of *Spergula arvensis* are similar to those of *Lychnis* before the appearance of the ovules (Pl. XXXIII. figs. 9–14). As in that species, five blunt carpellary prominences arise around the base of the slight convex central elevation. As in *Lychnis*, and as also in *Sagina apetala*, the loculi appear at first as slight depressions of a triangular shape (the bases of the triangles being directed outwards); but whereas in *Sagina apetala* the loculi soon become narrow throughout their whole length, in *Lychnis* and *Spergula* they only narrow below, and remain triangular in section above (Pl. XXXIII. fig. 10). As in *Lychnis*, the capsule-walls and dissepiments grow up, keeping on a level with the central elevation for a considerable time; then they begin to rise above it. When this has continued for a short time, the close resemblance between the development of *Lychnis* and that of *Spergula* and *Sagina* ceases. In *Lychnis* the dissepiments mount well above the central elevation before the ovules appear; when they do appear, the first are formed on the free projecting plates of the dissepiments, as has already been mentioned (Pl. XXXII. fig. 7). In *Spergula* and *Sagina* the capsule-walls and the outer parts of the dissepiments have risen decidedly, and the inner parts of the dissepiments have *barely* risen above the central elevation when the first ovules appear on its upper part (Pl. XXXIII. fig. 12). In *Spergula* four ovules are formed in each loculus. The walls of the capsule grow up rapidly and close over to form the roof; the upper part of the capsule is unilocular, owing to the dissepiments not meeting above (Pl. XXXIII. fig. 14).

The development of the capsule of *Arenaria verna*, *A. serpyllifolia*, and *A. trinervia* is very much like that of *Sagina apetala*. In these species the three pockets formed by the young carpels are narrow in a radial direction. The central elevation, on the first appearance of the carpellary prominences, is higher in proportion to its breadth than in *Sagina*; although the walls of the young capsule soon reach its apex, they do not rise above it till after the appearance of the first ovules on its upper sides (Pl. XXXV. figs. 5 & 6). In *Arenaria serpyllifolia* six ovules are formed in each loculus; in *A. trinervia* five ovules: in this latter species at the base of each seed is an aril formed of from twenty to thirty large elongated, thick-walled, transparent cells.

In the flower of *Stellaria media*, after the formation of the staminal whorls, the central elevation is almost hemispherical. The carpels first arise around its base as three blunt prominences, and these grow to the form of narrow pockets: the dissepiments soon rise almost to the apex of the central elevation as three low ridges of tissue; the capsule-walls have only risen to about two thirds of its height when the first ovules begin to appear on its upper part between the dissepiments (Pl. XXXV. fig. 7). In this species, when the flower opens, the dissepiments are detached from the lateral walls of the capsule, they have grown broad, and are of very loose tissue; the micropyles of the campylotropous ovules rest on, or are turned towards them, suggesting the idea that these present the course along which the pollen-tubes may be directed to the micropyles. Four ovules are formed in each loculus.

The development of the capsule of *Stellaria Holostea* closely resembles that of *S. media*; but the young pocket-like loculi are wide and open, the central column is short and thick; the ovules are four in each loculus, and, when fully developed, seem to arise from the upper extremity only of the slightly enlarged central column. As their funiculi are short, the cluster of seeds is confined to the base of the large inflated capsule.

The capsule of *Stellaria uliginosa* during flowering is enclosed for one third of its length by the calyx-tube. It is long and narrow, and contains about seventeen ovules; the slender central column occupies less than half the length of the capsule; from its apex to the roof of the chamber extend the loose-textured dissepiments, which have become detached from the lateral walls of the capsule.

The development of the capsule of *Cerastium quaternellum* is much like that of *Stellaria media* (Pl. XXXIV. figs. 9–14). The ovules appear on the upper part of the central elevation when the walls of the capsule have risen to about *two thirds* or *four fifths* of its height. The carpels are usually four; the ovules vary from four to twelve in each loculus.

In *Cerastium triviale* and *C. glomeratum* the central column is very conspicuous as soon as the staminal whorls have been formed, and grows rapidly after the formation of the five carpellary prominences. These acquire the shape of five very shallow, open pockets. The dissepiments are strongly developed; at the base of the pockets they are broad, but become gradually narrow and less marked, till they cease near the apex (Pl. XXXIV. fig. 2). When the first ovules appear between the uppermost ridges of the dissepiments, the capsule-walls have not risen to half the height of the central column. At a later stage they rise above it, and the dissepiments project into the upper part of the cavity of the capsule as five free plates (Pl. XXXIV. figs. 4 & 6). About sixteen ovules develop in each loculus.

Payer, in his 'Organogénie Végétale,' regards the placentas of all Phanerogams as formed from the axis, or from a branch of the axis. The margins of the carpellary leaf he considers derive their power of bearing ovules from being overlain with outgrowths of the branched floral axis. Holding this view, he would have no difficulty in explaining that, in the tribe Alsineæ of the order Caryophylleæ the ovules are developed entirely from the floral axis itself; and that in the tribe Sileneæ the ovules in the lower part of the capsule are developed from the axis itself, and in the upper part of the capsule from the outgrowths of the axis which form the dissepiments.

Eichler, in his 'Bluthendiagramme,' regards the origin of the placentas in this and in all other orders as carpellary.

Sachs, in his 'Text-book of Botany,' ascribes a different morphological significance to the ovules according to their mode of origin and their position. He suggests that "in some genera of Caryophylleæ the placentas are axial, while in others they would appear rather to be carpellary."

Taking the view of Sachs, that the significance of ovules may vary, it is evident that he would place *Lychnis* in that group in which the placentas would appear to be carpellary; and the examination of this plant would strongly lead us to this conclusion.

In consideration of the fact observed in *Lychnis* that the first-developed ovules are developed along the unattached margins of the dissepiments in the upper unilocular portion of the capsule, it must be admitted that the placentas are carpellary. It has been shown (Pl. XXXV.) that the capsule in Alsineæ is developed on essentially the same plan as that of *Lychnis*, the difference in the various genera being merely dependent upon the relative height attained by the carpels on the one hand, and by the central axis on the other. This being so, we are bound to admit that if we accept, as we do, the carpellary origin of the placentas in *Lychnis*, the placentas in the Alsineæ, from *Sagina apetala*, which most resembles *Lychnis*, to *Cerastium triviale*, which most widely differs from it, are carpellary also.

DESCRIPTION OF THE PLATES.

Plate XXXII.

Development of the Capsule of *Lychnis diurna*.

Fig. 1. Young flower: c=whorl of carpels appearing as prominences around the base of the central elevation; st=rudiments of stamens.

Fig. 2. Young capsule: the loculi appearing as shallow pockets.

Figs. 3 and 4. Older stages in the development of the capsule.

Fig. 5. Trans. sect. through the upper part of the capsule drawn in fig. 4.

Fig. 6. Trans. sect. through the lower part of the capsule drawn in fig. 4.

Fig. 7. Longitudinal section of a capsule, at the time when the ovules are appearing in its upper part.

Fig. 8. Transverse section through the upper part of a young capsule, showing the ovules arising from the free edges of the dissepiments, or from the inflexed margins of the carpellary leaves.

Fig. 9. Transverse section through lower part of an older capsule.

Fig. 10. Transverse section through the base of a capsule, taken from a bud that would soon open. The dissepiments are still attached.

Fig. 11. Longitudinal section of a capsule, taken from an open flower.

Fig. 12. Longitudinal section of a male flower, showing the elongated floral axis: the sepals are removed.

PLATE XXXIII.

1–8. Development of Capsule of *Sagina apetala*; 9–14 of *Spergula arvensis.*

Figs. 1–4. Young capsules in various stages of development.

Fig. 5. Longitudinal section of capsule drawn in fig. 4: the dissepiments have risen to the apex of the central axis.

Fig. 6. Long. section of capsule at time when uppermost ovules are appearing.

Figs. 7 and 8. Longitudinal sections of capsules in later stages of development.

Fig. 9. Very young capsule, showing the carpellary prominences arising round the base of the central elevation.

Fig. 10. An older capsule, viewed from above; Fig. 11, side view.

Fig. 12. Long. section of capsule viewed in fig. 11: ovules very rudimentary.

Figs. 13 and 14. Longitudinal sections of older capsules.

PLATE XXXIV.

1–8. Development Capsule of *Cerastium triviale*; 9–15. *Cerastium quaternellum.*

Figs. 1–4. Capsules in successive stages of development.

Fig. 5. Transverse section through lower part of capsule drawn in fig. 4. The ovules here are barely discernible.

Figs. 6–8. Longitudinal sections through older capsules. Fig. 8 is a section of a ripe capsule.

Fig. 9. Young capsule, showing the pocket-like loculi.

Fig. 10. An older capsule, viewed from above.

Fig. 11. Longitudinal section of the capsule drawn in fig. 10: the rudiments of the uppermost ovules are discernible.

Fig. 12. An older capsule.

Fig. 13. Longitudinal section of the capsule drawn in fig. 12.

Figs. 14 and 15. Longitudinal sections of capsules in older stages of development.

PLATE XXXV.

Capsules or longitudinal sections of the capsules of the species, investigated at the time when the ovules are first apparent, placed together for comparison:— 1. *Dianthus barbatus.* 2. *Lychnis diurna.* 3. *Sagina apetala.* 4. *Spergula arvensis.* 5. *Arenaria verna.* 6. *A. serpyllifolia.* 7. *Stellaria media.* 8. *S. uliginosa.* 9. *Cerastium triviale.*

Reproduction of the Zygnemaceæ; a Contribution towards the Solution of the Question, Is it of a Sexual Character?

By Alfred W. Bennett, M.A., B.Sc., F.L.S.

[Read November 15, 1883.]

The well-known mode of reproduction which occurs in *Spirogyra* and other genera belonging to the Zygnemaceæ, known as Conjugation, is always spoken of in botanical text-books as the simplest form of sexual union; but I am unable to meet with any record of trustworthy observations made with a view to determine whether the term is correctly applied; that is, whether there is any differentiation between the conjugating "male" and "female" cells. As much as twenty-five years ago that extremely acute observer, De Bary, in what is still the best monograph of this class of Freshwater Algæ[*], stated that he had observed in some instances clear differences between the conjugating cells. Wittrock, in his "Freshwater Algæ of Gotland,"[†] speaks of two species in which the "male" and "female" cells are uniformly different in size. But most recent writers on the Conjugatæ have either ignored these observations, or at least imply that they do not point to any essential physiological differences. Thus Wittrock[‡] elsewhere defines a zygospore as "a spore formed by an act of fecundation, in which two or more cells of the same kind, not sexually different, have participated." Pringsheim[§] strongly opposes the idea of sexuality in the Conjugatæ. H. C. Wood[‖] says, "Very rarely, if ever, is there any difference between the cells before conjugation; and it has not existed in any species that has come under my notice." But that writer agrees with De Bary (*l. c.* p. 163) in thinking that "in conjugation the first dawnings of sexuality are to be found." Berkeley, by his silence on the subject in his articles on "Conjugation" and "Zygnemaceæ" in the 'Micrographic Dictionary,' ed. 4, implies that he does not regard the differentiation as established. Finally, Cooke[¶] says, "The cells containing the male and female elements cannot at present be distinguished from one another."

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[*] 'Untersuchungen über die Conjugaten,' p. 4.

[†] Quart. Journ. Micr. Sci. 1873, p. 131.

[‡] "Spore-formation in the Mesocarpeæ," p. 4, footnote.

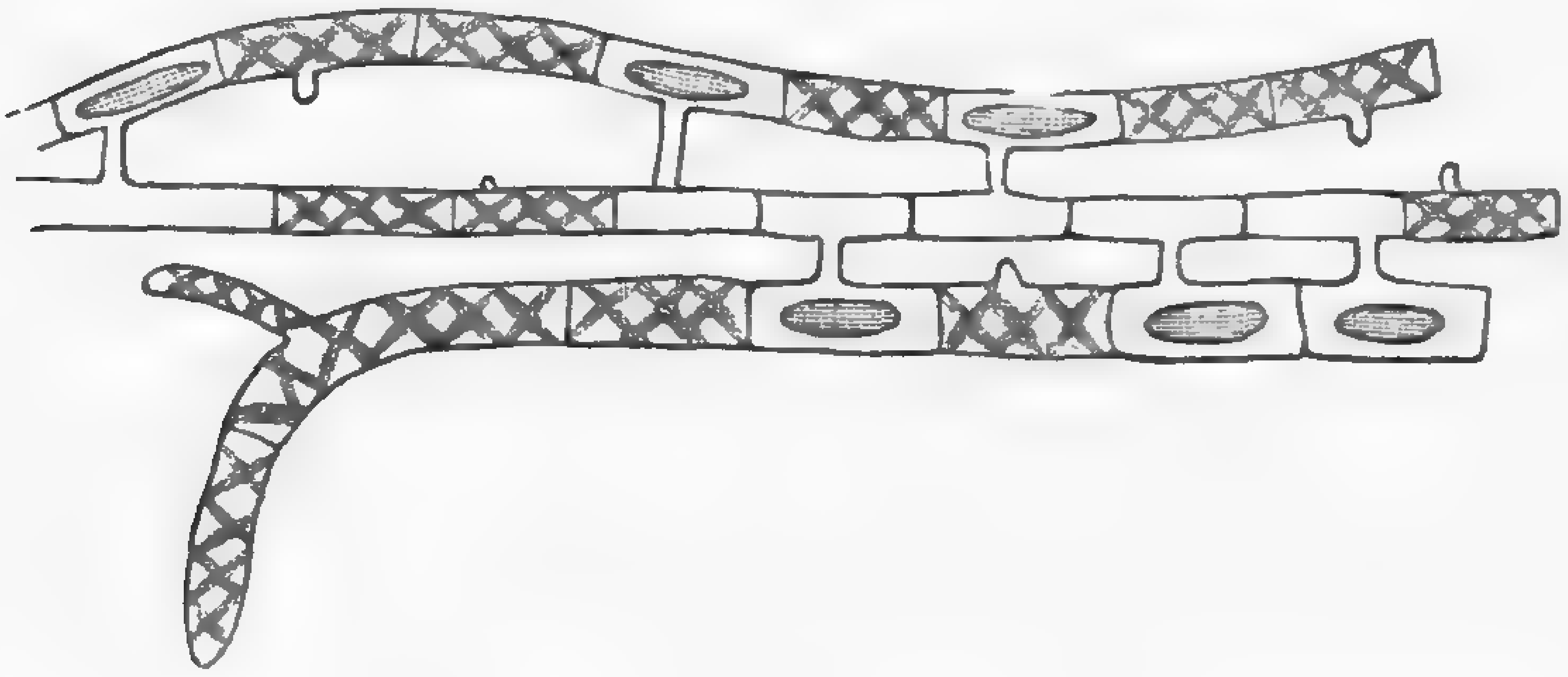
[§] 'Zur Kritik der Untersuchungen über das Algengeschlecht.'

[‖] 'Freshwater Algæ of North America,' p. 161.

[¶] 'British Freshwater Algæ,' p. 75.

My object in the present investigation has been to determine whether the difference described by De Bary and Wittrock could be substantiated as constant. My observation was first directed to the familiar and abundant genera *Spirogyra* and *Zygnema*, in which the endochrome assumes the form either of spiral bands or of two stars in each cell; and the conjugation is of the kind known as "scalariform"—that is, by means of longer or shorter canals, connecting the conjugating cells, through which the endochrome of one cell passes to mingle with that of the other cell.

Fig. 1.



Spirogyra porticalis, Vauch. One male filament in conjugation with two female filaments. ×70.

In the first place, a strong *primâ facie* argument in favour of the sexuality of the filaments exists in the fact that in the enormous majority of cases, when two filaments conjugate, the protoplasmic contents pass through in one direction only; that is, out of all the cells of one filament (A) into the cells of the other filament (B), and not some in one direction, some in the other. This is so nearly universally the case, that it cannot be the result of chance, but clearly follows some guiding law, and implies in itself a differentiation between the two filaments, justifying the designation of A as the "male" and of B as the "female" filament. The only important statement to the contrary that I have met with is by Hassall, who says*:—"It is curious to remark that the cells in one part of the same filament will part with their contents and remain empty, while in another they will be the recipients of the contents of the cells of another filament." But in 33 plates Hassall depicts only two species as conjugating in this way; and it is quite possible that the statement may be the result of an error of observation. So transparent are the filaments, that when two lie close together, it is often very difficult to follow either of them with certainty throughout its whole length; and I have often myself been deceived at first in this way. On the other hand, De Bary (*l. c.* p. 4) says:—"It is easy, with almost perfect certainty, to determine beforehand which of two filaments is the one that parts with, and which the one that takes up the protoplasm, if only conjugation has already taken place in one pair of cells; for almost always all the cells of a filament behave in this respect alike." H. C. Wood does not refer to this point. Cleve*, in his numerous drawings, gives two instances of what we may call "cross-conjugation;" Cooke, in 11 plates, not one. If, therefore, the phenomenon occurs, it is probably very rare. In my own observations, extending over several years and many species of *Spirogyra* and *Zygnema*, I have never seen a single instance. In one example only I observed the protoplasm in the cell of a male filament collecting into the form of a zygospore in a part of the filament where communication with the female filament was interrupted; but there was nothing to show that a fertile zygospore resulted. A further evidence of differentiation lies in the fact that, as far as my observation goes, when two filaments are about to conjugate, the change first commences in the cells of the male filament, the chlorophyll-bands of which lose their spiral arrangement, accompanied by contraction of the protoplasm, before those of the female filament (see fig. 2).

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* 'British Freshwater Algæ,' vol. i. p. 130.

The differentiation of the male and female filaments is even more striking when more than two are in conjugation, as is not unfrequently the case, and as has been repeatedly observed by De Bary and others (fig. 1). As far as my own observation goes, polygamy is here much more common than polyandry. I have seen different cells of the same male filament pass their contents into the cells which happened to be nearest them of no less than four female filaments. In one instance as many as thirty-six cells of the same filament passed their contents into other filaments, without transference in the opposite direction taking place in a single cell. It is very curious to watch a male lying between two female filaments and passing its cell-contents sometimes into one, sometimes into the other. Cleve (*l. c.* pl. v. fig. 8) and Cooke (*l. c.* pl. xxxv.) have figured the same. This tendency to polygamy appears to arise from the fact that the male are very much less abundant than the female filaments*. It follows that a large number of female filaments, or of cells in the female filaments, do not conjugate at all; in these the protoplasm and chlorophyll retain their original form. Very rarely they contract into an apparent zygospore; but whether these were fertile I have had no opportunity of ascertaining. It is quite probable that parthenogenesis does sometimes take place.

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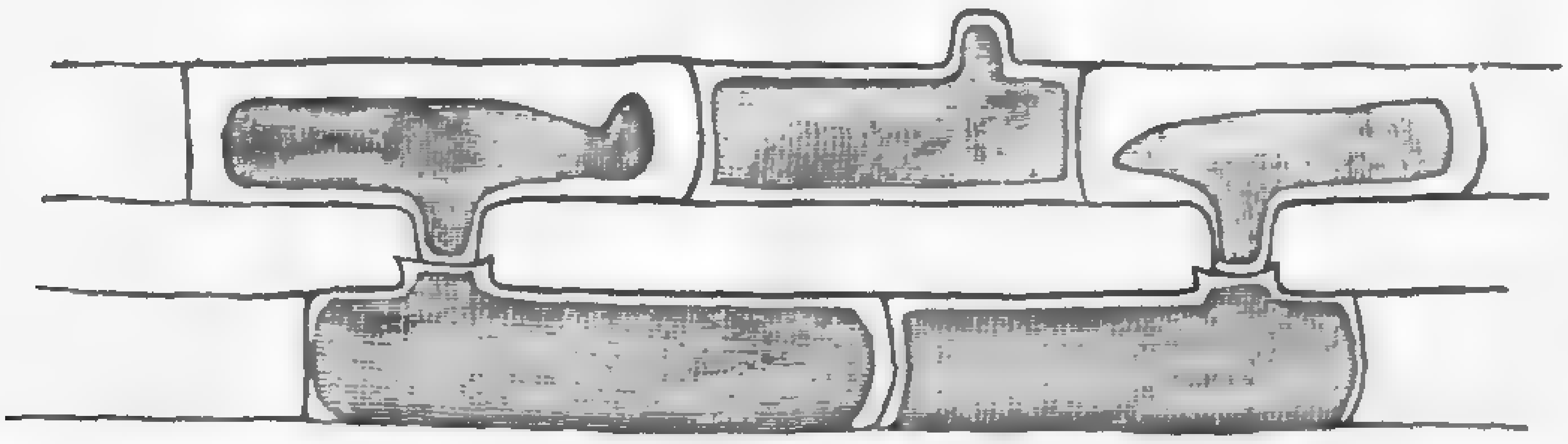
* 'Monografi af algfamiljen Zygnemaceæ.'

But if there is any real previous differentiation between the male and female filaments, it would probably manifest itself in some way or other in the cells themselves. De Bary (*l. c.* p. 4) states that in *Spirogyra Heeriana* there is a small but constant difference between the primordial utricles of the two conjugating cells—that of the active [male] cell being pear-shaped, with the narrow end projecting into the canal; that of the passive [female] cell nearly globular. This difference, however, could only be detected after contraction of the protoplasmic contents of the cells had taken place. I was led myself rather to expect a differentiation in respect to size. In the allied genus *Sirogonium* Cleve (Quart. Journ. Micr. Sci. 1873, p. 131) describes two species, *S. punctatum* and *S. stictitum* (comprising the whole genus), in which the female cell is distinctly longer than the male cell. The following observations and measurements refer to one or other of the numerous forms of one of the commonest species of *Spirogyra*, *S. porticalis*, Vauch., growing in a freshwater aquarium.

Fig. 2.



S. porticalis. Conjugating filaments, showing relative size of male (upper) and female (lower) cells. ×165.

Assuming the active filaments, or those which empty themselves of their contents, to be male, and those in which the zygospores are formed to be female, I find a very common, if not invariable, difference both in the diameter of the filaments and in the length of the cells. Of a large number of measurements, which all agreed more or less decisively on this point, the following may be given as samples:—A. Male cells ·0762 × ·028 mm.; female cells ·127 × ·0432 mm. B. Male cells ·089 × ·0315 mm.; female cells ·1016 × ·0381 mm. C. Diameter nearly the same, 13 male cells corresponding in length to 10 female cells. On a broad average, the female cells exceed the male in both length and diameter by about one fourth or one fifth*. Indeed, as regards length, this may be seen at a glance. When two filaments have conjugated for any considerable length, it is very common to see every cell of the female filament occupied by a zygospore, while in the male filament there are here and there cells which have not participated in the conjugation: this is illustrated in fig. 2, and is confirmed by Wood's drawing of *Spirogyra setiformis* (*l. c.* pl. xv. fig. 3 *b*), though Hassall (*l. c.* p. 29) has drawn the reverse. The cells of the male filament which are shut out from conjugation usually push out protuberances on the side facing the female filament, which, however, they do not reach, no corresponding protuberance being put out to meet them; less often on the side away from the female filament. Very rarely does one female conjugate with two male cells, receiving the contents of both; De Bary has drawn an instance of this (*l. c.* pl. i. fig. 17).

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* This may be compared with the much greater abundance of female than of male individuals in such diœcious water-plants as *Anacharis*, *Vallisneria*, *Hydrocharis*, &c.

An argument which has been used against the sexuality of the process of conjugation is that the protuberances are put out by both the conjugating cells, which are therefore assumed to be physiologically homologous. But we find that even in flowering-plants some advance is made towards the act of impregnation by the female element, as in those cases where the embryo-sac actually protrudes through the micropyle in order to meet the pollen-tube. We need not therefore be surprised to find the same phenomenon still more pronounced when the differentiation of the male and female elements is so comparatively slight. Pringsheim (*l. c.*) argues against the sexuality of the process on the ground that zygospores are occasionally formed without the cooperation of two cells. But even if these are ever fertile, which is by no means certain, the discovery of the wide distribution of parthenogenesis in the vegetable kingdom in classes of plants where the normal mode of reproduction is a much higher form of the sexual materially weakens the force of his argument.

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* Since reading this paper, I have met with the following:—"*Spirogyra setiformis*, var. *inæqualis*, new var. A peculiar variety of this species, consisting of two sizes of filaments, the one 125 μ, the other 80 μ in diameter; the two in conjugation. The smaller form has the thickness and the appearance of *S. nitida*, but must be accounted a variety of *setiformis*. Sometimes two larger filaments are in conjugation, sometimes two smaller ones; but more frequently a larger and a smaller one are united."—F. WOLLE, in Bull. Torrey Botanical Club, vol. x. 1883, No. 2.

It is worthy of note, as confirming the view here indicated, that I could frequently detect a slight difference between the protuberances put out by the male and female cells, that from the female cell being shorter, but of larger diameter. The dividing septum is therefore, as a rule, in the half of the conjugating tube nearest to the female filament. The protoplasm, in passing through the connecting tube, appears to press down this dividing septum, as shown in fig. 2, so as to make it concave, and causing the narrower protuberance to fit into the broader one after the fashion of a ball-and-socket joint. During and after conjugation the connecting tube gives the impression, in the ordinary lateral view, as if it were still divided by a septum; this is due to the perforation leaving an annular portion of the septum attached to the sides of the tube, like a collar, as may be seen on viewing such an orifice from above (see fig. 3).

Fig. 3.

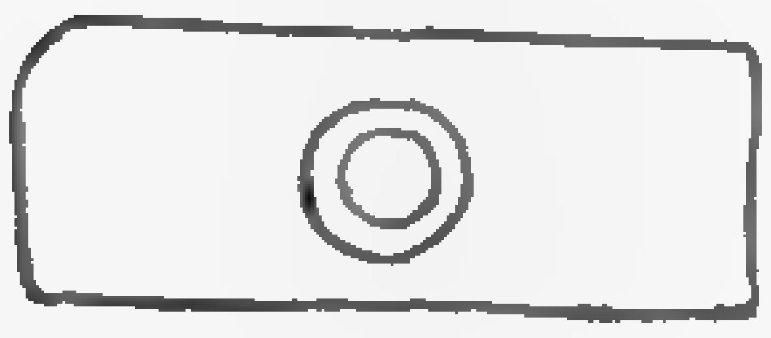

Fig. 4.

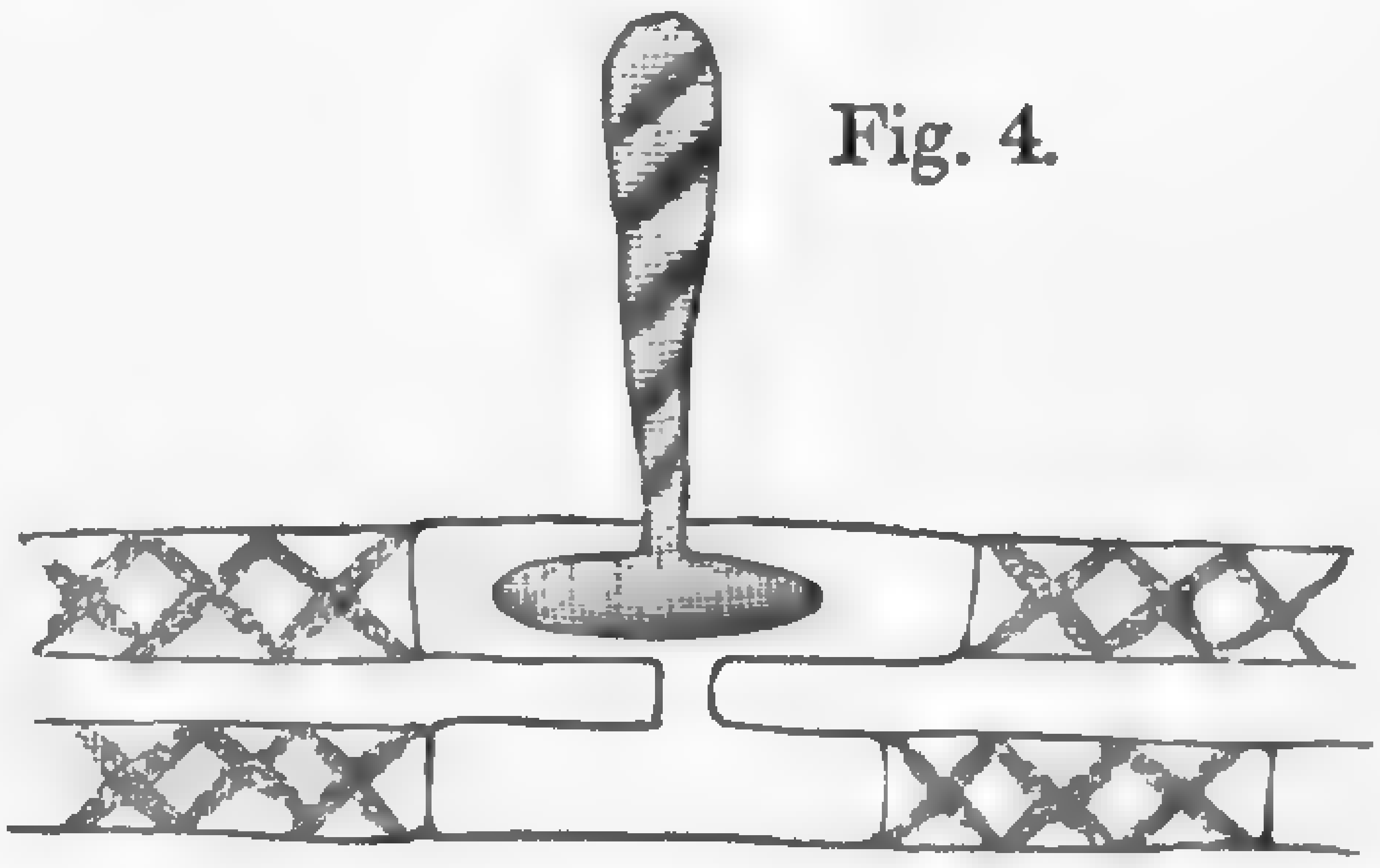

Fig. 3. *Spirogyra porticalis.* Conjugating tube, seen from above. ×165.
Fig. 4. *S. porticalis.* Zygospore germinating while still in mother-cell. ×165.

On two points not connected with the process of conjugation I wish to say a few words. The filaments of the Zygnemaceæ are always described and drawn as unbranched. This is by no means invariably the case. It is not uncommon for a cell to branch; but I have never seen such a branch cut off by a septum. As far as I have observed, this tendency to branch is confined to non-conjugating cells of female filaments (fig. 1). De Bary (*l. c.* pl. iii. fig. 15) observes the same with respect to *Zygnema* and *Mougeotia*; and states that here the branch is not only cut off by a septum, but is itself septated.

On the second point I appear to be at issue with previous observers. In a well-known drawing of the germination of a zygospore of *Spiroyyra* by Pringsheim*, reproduced in part in Sachs's 'Text-book' (2nd English ed. fig. 170), the germinating filament is represented as proceeding from one end of the zygospore, and this whether germination takes place within the mother-cell or after the zygospore has escaped from it. The same general direction of growth is represented by Cleve (*l. c.* pl. i. fig. 3, & pl. vii. fig. 9), and less distinctly by Vaucher, De Bary, and others. In a zygospore of *S. porticalis* which I observed germinating while still within the mother-cell (fig. 4), the germinating filament was unquestionably proceeding from one side of the zygospore, and therefore at right angles to the previous direction of growth.

The genera *Mesocarpus* and *Staurospermum* (together with the doubtful genus *Craterospermum*) are formed by De Bary into a distinct family of Mesocarpeæ, on the ground that, in his view, the product of conjugation is not a true zygospore which germinates directly, but more properly a carpospore which divides into a fertile resting-spore and several barren cells. Into the discussion of this interesting question I do not propose to enter. *Mesocarpus* differs from *Spirogyra* and *Zygnema* in two conspicuous characters. First, in the arrangement of the endochrome, which is well described by De Bary as forming an axile plate; that is, it is all collected in one plane passing through one diameter of the nearly cylindrical cell. Looked at, therefore, in what we may call the profile view (fig. 5 *a*), the chlorophyll appears to occupy a single narrow band passing across the cell; but if the cell is turned through an angle of 90° so as to get the front view, the position in which the filament appears naturally to place itself on the glass slide (fig. 5 *b*), the appearance is presented as if the cell were filled in the ordinary way with protoplasm uniformly pervaded by chlorophyll. In either case a

Fig. 5.

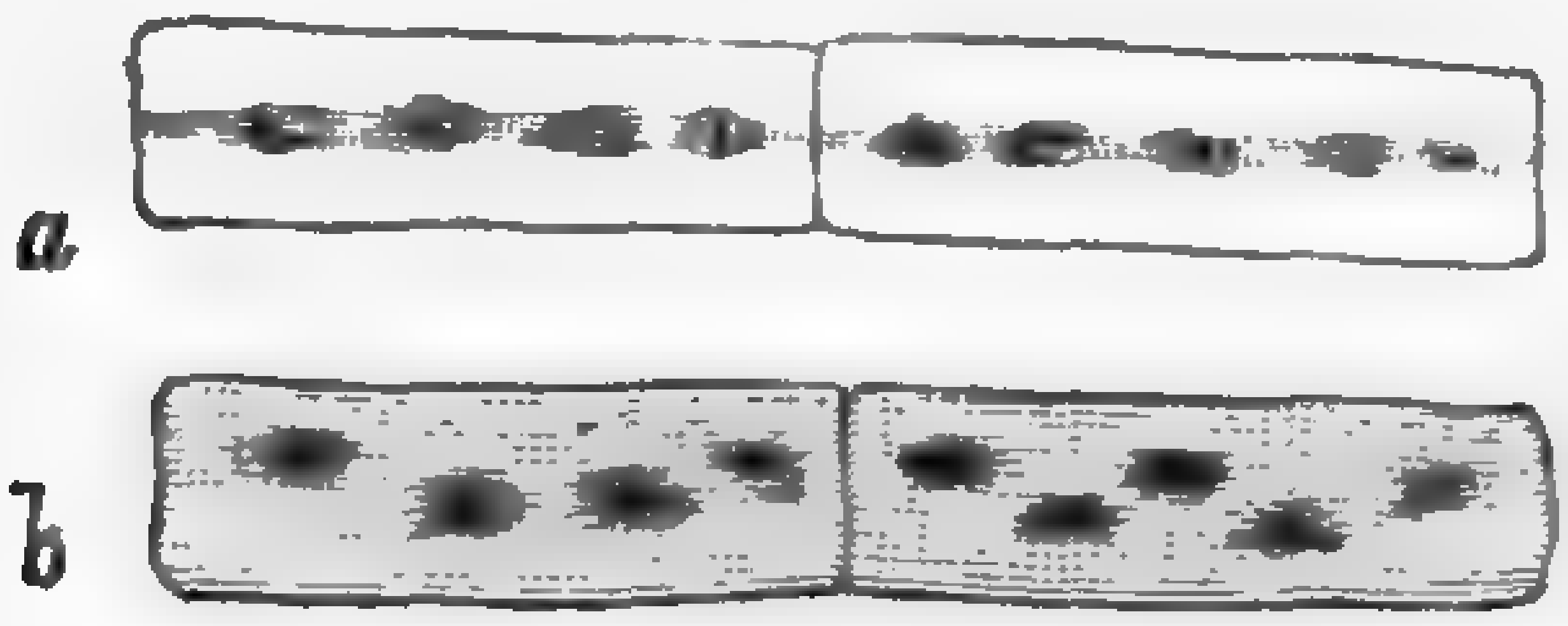

Fig. 6.

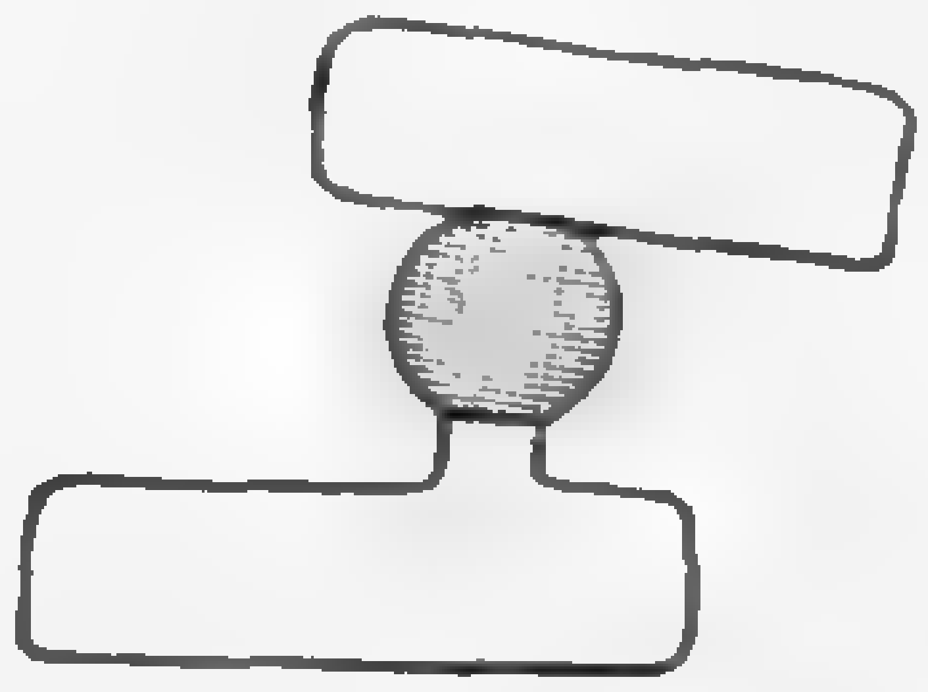

Fig. 5. *Mesocarpus scalaris*, Hass. Cells showing axile plate of protoplasm: *a*, profile, *b*, front view. ×166.

Fig. 6. *Mesocarpus scalaris*. Two cells in conjugation. × 165.

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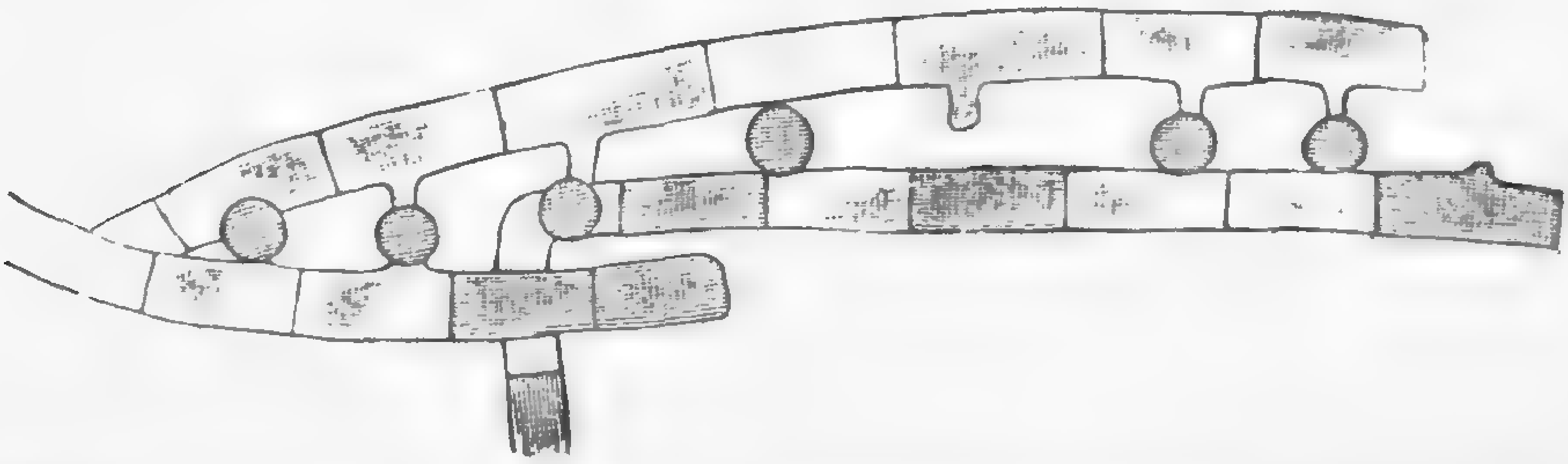
* 'Flora,' Aug. 14, 1852, pl. v.

number of conspicuous starch-grains are observed in the protoplasm, usually from 4 to 6. In the same filament the plates of endochrome in the various cells appear always all to lie in one plane; and the conjugating processes are put out from the side of the cell in contact with the axile plate of protoplasm. Secondly, the zygospore is not formed in one of the conjugating cells, but in the conjugating tube, into which the endochrome passes from both the conjugating cells (see figs. 6 & 7).

Two other points of difference should also be noted. As soon as the zygospore is fully formed, it is always sharply marked off from the rest of the conjugating tube, or from the mother-cell, by a cell-wall on either side (figs. 6, 7). This is well shown by Cleve, *l. c.* pl. ix. figs. 8, 9. Cooke (*l. c.* pls. xli. & xlii.) represents this septum in the case of *M. recurvus*, but not in those of *M. scalaris* or *M. parvulus.* The other point, so far as I am aware, has not been noticed by previous observers, but it may have an important physiological significance. In *Spirogyra* and *Zygnema* the whole of the protoplasm of the conjugating cells is used up in the production of the zygospore, and they are left completely empty. In *Mesocarpus*, on the contrary (fig. 7), a portion of the endochrome appears to be always left behind in both the conjugating cells.

Fig. 7.

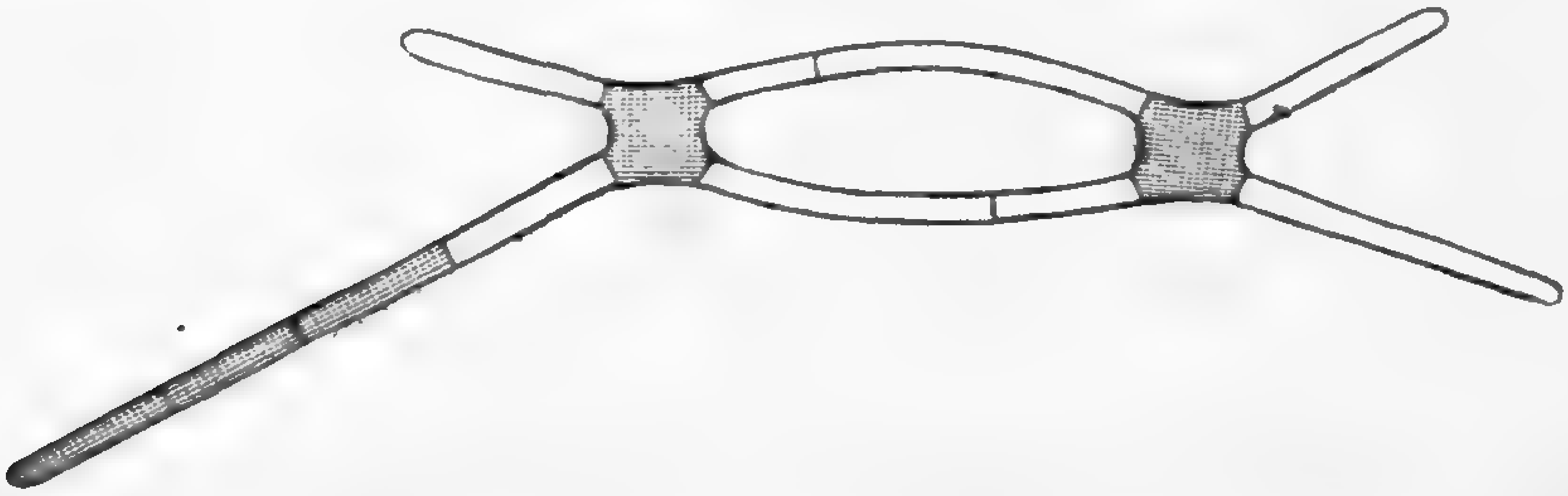


Mesocarpus scalaris. Conjugating filaments, showing relative size of male (upper) and female (lower) cells. ×100.

Although the probability of a differentiation between the two conjugating cells appears at first sight to be much less in the case of *Mesocarpus* than of the two genera already described, yet a careful observation shows that here also it is not impossible. My observations were made on *M. scalaris,* Hass., which I found in conjugation, though rather sparingly, in September, forming dense light-green mats on the surface of moor-ditches and pools in Yorkshire. The first point that struck me was that the zygospore does not usually, although so represented by Cooke (*l. c.* pl. xlii.)

and others, occupy the whole of the connecting tube; and the portion of the tube which it occupies is never its centre, except that, where the conjugating filaments lie close together, the tube is so short as to be entirely filled by the zygospore. Otherwise it appears to be always nearer to one end than the other (fig. 6); and a certain amount of differentiation is indicated by the fact that when a number of zygospores are formed between two conjugating filaments, the whole of them are nearer to one filament and further from the other (fig. 7). This I observed in several cases where as many as seven or eight pairs of cells were conjugating. If we follow out by analogy the physiological value of the two cells assumed in the case of *Spirogyra* and *Zygnema*, we may suppose that we have here a still more rudimentary differentiation of the male and female elements, the differences between the forces being too small to result in the complete passage of the male element into the female cell. The filament nearest to which the zygospores are formed must here be regarded as the female; that which puts out the longer protuberances as the male filament. It became then of interest to determine whether there was here again any difference in size between the cells of the male and female filaments. And here a very unexpected circumstance was revealed. In the diameter of the two filaments I could detect no difference whatever. It is given by Cooke as ·034 mm., which may be regarded as a fair average. But in the length of the cells there was a distinct difference—the average of that of the male cells being about ·11, of the female cells about ·085, the very singular phenomenon being exhibited of the female cells being smaller, instead of larger than the male cells.

Fig. 8.



Staurospermum gracillimum, Hass. Two filaments in conjugation. ×165.

In *Staurospermum* (fig. 8), where the zygospore is formed by the conjugation of four cells which are completely emptied of their contents, and is sharply marked off by a cell-wall, it appears much more difficult to conceive of any sexuality in the process. I have not, however, been fortunate enough to be able to trace the entire course of conjugation in this genus, though I have met with the fully formed zygospores intermixed with *Mesocarpus.*

It must be remarked, in conclusion, that if the mode of "lateral" conjugation described by De Bary, Wood, and others as taking place between adjacent cells of the same filament in *Zygnema* and *Spirogyra* be founded on correct observation, all idea of sexuality of the filaments must be abandoned in these cases.

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On the Structure of the Stem of *Rhynchopetalum montanum* (Fresen.) *. By F. O. Bower, M.A., F.L.S.

[Read December 20, 1883.]

(Plates XXXVI.–XXVIII.)

Rhynchopetalum montanum is a native of Abyssinia, growing in districts 11,000 to 13,000 feet above the level of the sea. It differs from the allied *Lobelias* in being a plant which lives through more than a single year. The small lanceolate leaves first formed are succeeded as the plant grows older by larger ones, arranged on a more complicated plan, while the earlier leaves are successively thrown off and wither. The stem, which meanwhile increases in bulk, is completely covered externally by the scars or bases of leaves which have thus been thrown off. These scars appear as diamond-shaped areas on the surface of the stem, and are covered by a thick layer of corky tissue, in which the ends of the vascular bundles of the leaf-trace (five in number) may often be clearly seen. As the stem increases in bulk, the corky covering is split and fissured, so that the outline of the leaf-scars becomes unrecognizable. In this condition the old stem is not unlike that of some Cycads in external appearance. The stem, growing thus for four or five years, gradually attains a considerable thickness (a specimen in the museum at Kew is about 5 inches in diameter); it is columnar in form, and is, in most cases at least, unbranched; it reaches a height of 12 to 15 feet.

Internally it is succulent, especially when young; older stems are of sufficient hardness and strength to be used in Abyssinia for building purposes.

Axillary buds appear in the axils of the leaves at an early stage; but they are not developed beyond the first stages until the leaves, in the axils of which they are placed, have fallen off. Some, but not all, of them grow actively, developing a tuft of leaves, and on their underside often forming roots, which establish themselves in the soil. These axillary buds, which often appear as though they were of adventitious origin, especially at the lower part of the stem, are undoubtedly of use in carrying on the life of the plant when the main axis, having flowered and fruited, dies down, as in the case of *Agave* (Richard, *l. c.*). They are used in propagating the plant artificially.

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* De Candolle, 'Prodromus,' vol. viii. p. 396. Fresenius, Bot. Zeit. Flora, Oct. 1838, p. 603, and figured by him, 'Museum Senckenberg.' iii. Taf. iv. Richard, Flora Abyss. vol. ii. p. 9. Figured from a Kew specimen, Bot. Mag. 5587.

Not only is *Rhynchopetalum* remarkable among the Lobeliaceæ for its size and external appearance, but also for its internal structure. *Lobelia macrostachya*, *L. splendens* var. *ignea*, and *L. Erinus*, also *Siphocampylus*, have been examined; but the structure of the stem of these plants was in each case found to be normal.

The early stages of development of the vascular system of the stem and leaves were studied in the young axillary buds above mentioned. It is assumed that the structure of these is not unlike that of young seedlings. The latter have not been investigated, since the available plants at Kew had all been derived as axillary buds from older plants, and not raised from seed.

In these young axillary buds the arrangement of the leaves is simpler and less crowded than on older axes; and therefore the vascular connexions of each leaf can be more accurately distinguished from that of its neighbours than is possible in older stems.

Successive transverse sections of such buds show that the first formed bundles are those which take a median course in the young leaf (x in figs.), and on entering the stem pass inwards and arrange themselves in the normal manner, in a more or less regular circle, about the centre of the axis. Shortly after these the first pair of lateral bundles of the leaf-trace are formed (y in figs.), which likewise run directly into the stem, perpendicular to its surface, then, curving suddenly towards the central bundle, they coalesce with it in the cortex at points nearly opposite one another, and at a short distance outside the ring of bundles above described. This coalescence of the first pair of lateral bundles of the leaf-trace with the central bundle seems to be the rule, though in the older stems such a connexion is not always to be made out, and it is possible that it does not always occur.

Almost simultaneously with the first pair, or slightly later, a further pair of lateral bundles appears (z in figs.), the connexions of which are less regular than those of the first-formed pair; they are, however, attached, in the majority of cases, and especially in young buds, to the bundles of the first pair. The minute structure and composition of the young bundles present no peculiarities worthy of special remark.

Thus we have in the young bud of *Rhynchopetalum* a leaf-trace consisting of five bundles, which enter the stem. In the cortex the lateral bundles fuse successively with the central bundle, which, pursuing a direct course towards the centre, finally ranges itself, with similar bundles from other leaves, in the central ring-like series, such as is normally found in Dicotyledonous stems.

Soon after the lateral bundles of the leaf-trace become distinguishable, a new system of bundles of exclusively cauline nature is formed in the cortex. These may be called "cortical bundles" or "cauline peripheral bundles" ("Rindenstränge," *cf.* Mettenius, Beitr. zur Anat. d. Cycadeen). They first make their appearance as groups of small cells, resulting from the division of cells of the cortex. The central portions of these groups develop as xylem, the peripheral portions as phloem, while a slowly active cambium lies between them. The result in each case is the formation of a series of wedge-shaped bundles, which, being arranged radially round a centre, constitute together a cylindrical group. The xylem, which forms the greater part of these bundles, consists of spiral and pitted elements, surrounded by and imbedded in parenchyma, which is present in considerable quantity; in the phloem, also, much parenchyma is present, together with laticiferous vessels. The course which these bundles take is a more or less steep spiral, according to the arrangement of the leaves; they run almost at right angles to the parastichies in which the leaves are arranged, while their position is such that the median bundle of each leaf is always about halfway between two successive cortical bundles. The spiral cortical bundles are themselves connected with the lateral bundles of each leaf-trace; the exact point of junction varies, but is usually at or near the sharp curvature of the lateral bundle towards the central bundle of the leaf-trace, prior to their coalescence. The cortical bundles do not remain as single strands throughout their course, but here and there they separate into two or more strands, which soon fuse again to a single strand; they thus appear when isolated as a succession of loops of varying size (Pl. XXXVIII. fig. 4). In older stems, where the vascular system has been strongly developed, it has been possible to obtain vascular skeletons by the rotting of the parenchymatous tissues; and in these the connexions of the cauline and the common systems and the course of their constituent bundles have been more exactly observed. Part of such a skeleton is represented in fig. 4, in which are shown the steeply spiral cortical bundles (*a*, *a*). These, as above noted, often split up and again coalesce, thus forming a series of loops. Further, the successive spirals are connected one with another by branch bundles, which run almost vertically (*b* in the figures). The space between them is thus cut up into a number of diamond-shaped areas; through the centre of each of these areas the central bundle of a leaf-trace passes on its course from the leaf (or leaf-scar) to the central ring of common bundles, thus describing a course in a direction perpendicular to the surface of the cylindrical network of cortical cauline bundles. As each bundle passes through the network, it gives off right and left branch bundles, which are the branches connecting the lateral bundles of the leaf-trace with the central bundle. These, as above described, are connected with the cortical system at or near to the point where they curve suddenly in their course. The result is that in old stems it appears as though lateral bundles of the leaf-trace were given off originally from the network of cauline bundles, whereas in reality the cauline system is of later origin, and connects the earlier-formed vascular systems of successive leaves one with another. The position of the four-sided leaf-scars and of the several bundles of the leaf-trace relatively to the network of cortical bundles will be readily understood on comparing figs. 4 & 5, Pl. XXXVIII.

Besides the bundles hitherto described, other smaller branch bundles may be seen in old stems traversing the outer portions of the cortex (fig. 2); the course of these does not appear to be constant, and has not been accurately followed.

As it grows older the stem increases in bulk. Judging from a single dry specimen of an old stem in the museum at Kew, this would appear to be chiefly due to a secondary increase of the bundles of the normal vascular ring, which, in the specimen in question, is nearly 2 inches in thickness. But the bundles of the cortical system, as well as the central bundles of the leaf-trace, also increase in bulk, and appear, in the large specimen at Kew, at least $\frac{1}{8}$ inch in diameter.

No system of cortical bundles was found, even in the oldest roots examined.

It remains to draw a comparison between this abnormal arrangement of bundles in *Rhynchopetalum* and that in other plants.

Among Dicotyledons, cortical bundles formed at an early period in the growing stem, and having a definite position relatively to the bundles of the leaf-trace, are found only in comparatively few cases; and in many of those cases such cortical bundles may be regarded merely as branches or continuations of the common bundles of the leaf-trace, which ultimately enter the normal ring. This is the case in species of *Lathyrus*, in *Casuarina*, and many *Begonias*. In other instances the cortical bundles have a similar origin to those above cited; they, however, do not enter the ring, but form a cortical system connected with the ring by anastomoses at the nodes. This arrangement is found in the Calycantheæ and many Melastomaceæ. In a third series of succulent plants, including especially forms with reduced leaves, bundles are found ramifying in the cortex as in the lamina of the leaf; and, finally, in the winged Rhipsalidaceæ the common bundles of the leaf-trace are chiefly cortical and surround a central ring, which is for the most part cauline.

It is clear that the case of *Rhynchopetalum* does not coincide exactly with any of these, since, as above stated, the cortical system does not consist of branches of bundles of the leaf-trace, but are cauline bundles. A closer comparison may, however, be drawn between the stem of *Rhynchopetalum* and that of *Cycas* as described by Mettenius *. There the girdle-like bundles of the leaf-trace are connected with one another by bundles, which pursue a nearly vertical course and together form an "accessory cortical system." They originate from a secondary meristematic activity of longitudinal rows of cells of the cortex, strands of small cells being thus formed, which develop into small vascular bundles with a radial arrangement of their elements round a centre. This is fundamentally the same process as has been above described for the cortical bundles of *Rhynchopetalum*. The chief difference between the two cases lies in this: that in *Rhynchopetalum* the cortical bundles run obliquely, and together form an approximately regular network with four-sided meshes, which bear a definite relation to the bases of the leaves, and therefore also to the bundles of the leaf-trace; in *Cycas*, however, the bundles of the accessory cortical system are not thus regularly arranged, and pursue an almost vertical course. In both cases the mode of origin is the same; and in both cases the cortical system thus formed is permanent and capable of secondary increase.

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* On *Cycas circinalis*, *cf.* description by Miquel, 'Ueber d. Bau' &c.; on *Cycas circinalis*, Linnæa, Bd. xviii. p. 125. On *Cycas revoluta*, *cf.* Mettenius, "Beitr. z. Anat. d. Cycadeen," Abhandl. d. k. Sächs. Ges. d. Wissensch. vii. p. 567.

In *Cycas* the occurrence of this system of accessory bundles in the cortex may be regarded as a response to a physiological need. The vascular bundles being the chief and most rapid channel of transfer of water and of nutritive materials, if *Cycas* were dependent only upon the girdle-like bundles of the leaf-trace for this transfer between stem and leaf, the channel would be very long and indirect. The accessory cortical bundles act in this case as short cuts, so to speak, reducing the distance which must be traversed, and at the same time making the vascular connexions of the massive cortex much more complete.

It can hardly be doubted that the bundles of the cortical system of *Rhynchopetalum* have a similar physiological function, though it must be confessed that the requirements are not so great as in the case of *Cycas*.

In conclusion, it may be again noted that, not only in internal structure but also in external appearance the old stem of *Rhynchopetalum* resembles that of some Cycads. This is especially true for the lower portions of the old stem, where the increase of girth has been accompanied by the formation of fissures in the outer tissues, so as to obliterate the scars of the leaves. Such a case of similarity of stems of plants belonging to distinct classes should serve as a warning to palæontologists. It can easily be imagined that even a well-preserved fossil specimen of the stem of *Rhynchopetalum* might pass as that of a Cycad, and *vice versâ*.

DESCRIPTION OF THE PLATES.

Lettering used throughout:—*a*=main cortical bundles; *b*=secondary branches; *r*=normal ring of bundles in the stem; *x*=median bundle of leaf-trace; *y*=first pair of lateral bundles of leaf-trace; *z*=second pair of lateral bundles of leaf-trace.

Plate XXXVI.

Upper portion of an old stem of *Rhynchopetalum montanum* seen from outside; the spiral lines running over the leaf-scars indicate the position of the spiral cortical bundles.

Plate XXXVII.

Lower portion of the same stem as in foregoing Plate, showing the gradual obliteration of the leaf-scars by formation of longitudinal fissures.

Plate XXXVIII.

Fig. 1. Thick transverse section of a young shoot, made transparent with potash

and glycerine, and showing the vascular system of three leaves; the cauline cortical bundles have hardly begun to make their appearance. × 20.

Fig. 2. Section through the periphery of an older stem, showing the connexions of the five bundles of a single leaf-trace (*x*, *y*, *z*) and their position relatively to the cortical bundles, *a a*. × 3.

Fig. 3. A similar section, showing in addition the irregular cortical bundles, the course of which was not followed.

Fig. 4. Thick transverse section of a stem; the parenchyma has been partly dissected away, and then made transparent with potash and glycerine.

Fig. 5. View from without of a small part of the system of cortical bundles of an old stem which had lost all the soft parenchyma by rotting. The dotted lines indicate the position of the leaf-scars relatively to the bundles.

Fig. 6. View of the diamond-shaped leaf-scars from without, showing the five bundles of each leaf-trace; behind is drawn a diagram of the network of bundles of the cortical system; the arrow shows the direction of the main axis.

Fig. 7. Transverse section of a single circular group of cortical bundles; the parenchyma at the periphery is pressed out of shape by the increase in bulk of the group of bundles. ×20.

Fig. 8. Longitudinal radial section of stem, showing the relative positions of bundles of leaf-trace (*x*, *y*, *z*), cortical bundles (*a*), and the normal ring (*r*). × 20.

On the Development of Starch-grains in the Laticiferous Cells of the Euphorbiaceæ. By M. C. Potter, B.A., St. Peter's College, Cambridge. (Communicated by Dr. S. H. Vines, F.L.S.)

[Read December 20, 1883.]

The Euphorbiaceæ are characterized by possessing numerous laticiferous cells in the ground-tissue of their stems and leaves; these, in addition to containing latex, also contain large quantities of starch-grains, peculiar and irregular, known as rod- or bone-shaped. These grains appear to have been first observed by Meyen[*] about the year 1836.

As regards the formation of starch, Crüger[†] says:—

"All starch-grains come from the protoplasmic layer, which lines the inner wall of the cell as long as it is capable of development, and as long as protoplasm exists in the cell. In all starch-grains where the layers are distinctly formed, and a distinct and excentric hilum exist, one notices that the hilum is always on that side of the starch-grain which is furthest from the place of deposition.

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[*] 'Ueber die Secretions-Organe der Pflanzen:' Berlin, 1837. Schleiden's 'Principles of Botany,' p. 20.

[†] "Westindische Fragmente, Drittes Fragment," Bot. Zeitung, 1854.

"If one observes cells with starch-grains which are even in their earliest stages of development, one sees that, at the end which is in contact with the protoplasm or chlorophyll-corpuscle, generally a layer of a substance is deposited which is distinguished optically from the protoplasm or chlorophyll-corpuscle and from the starch-grain. On treatment with iodine one sees that this outermost layer of the starch-grain is not coloured blue, and that it is not stained so deep or dark a brown as the protoplasm or chlorophyll-corpuscle.

"I consider that this layer, which is always present, though difficult sometimes to see unless earnestly sought for, to be a substance which will become starch, but which has not the property to stain blue with iodine, and which moreover (perhaps) contains nitrogen or protein substance."

This layer Crüger calls intermediate substance ("Uebergangssubstanz"). With special reference to the Euphorbiaceæ he remarks :—

"The development of the cut-off or knotty rods, which arise in the so-called remarkable vessels of the Euphorbiaceæ, agree with those described above in so far that the young grains are round. Layering, or intermediate substance, or a polarization-cross I could not observe."

Fig. 1.

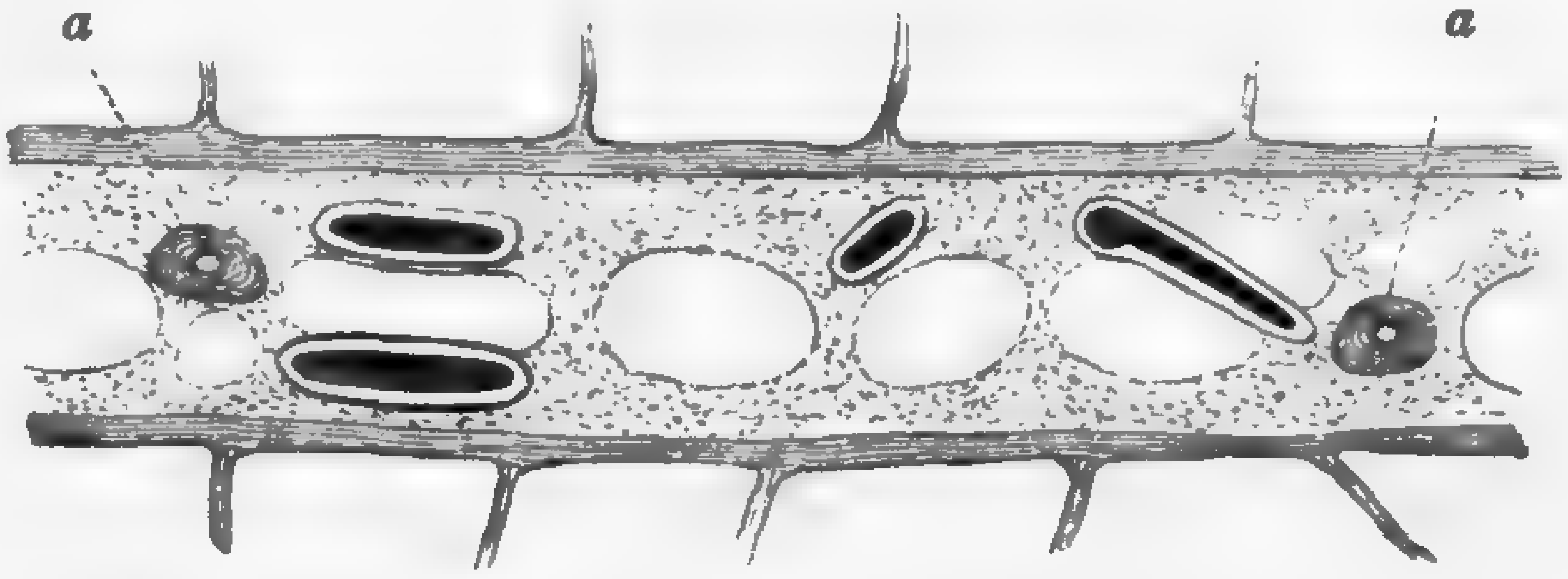
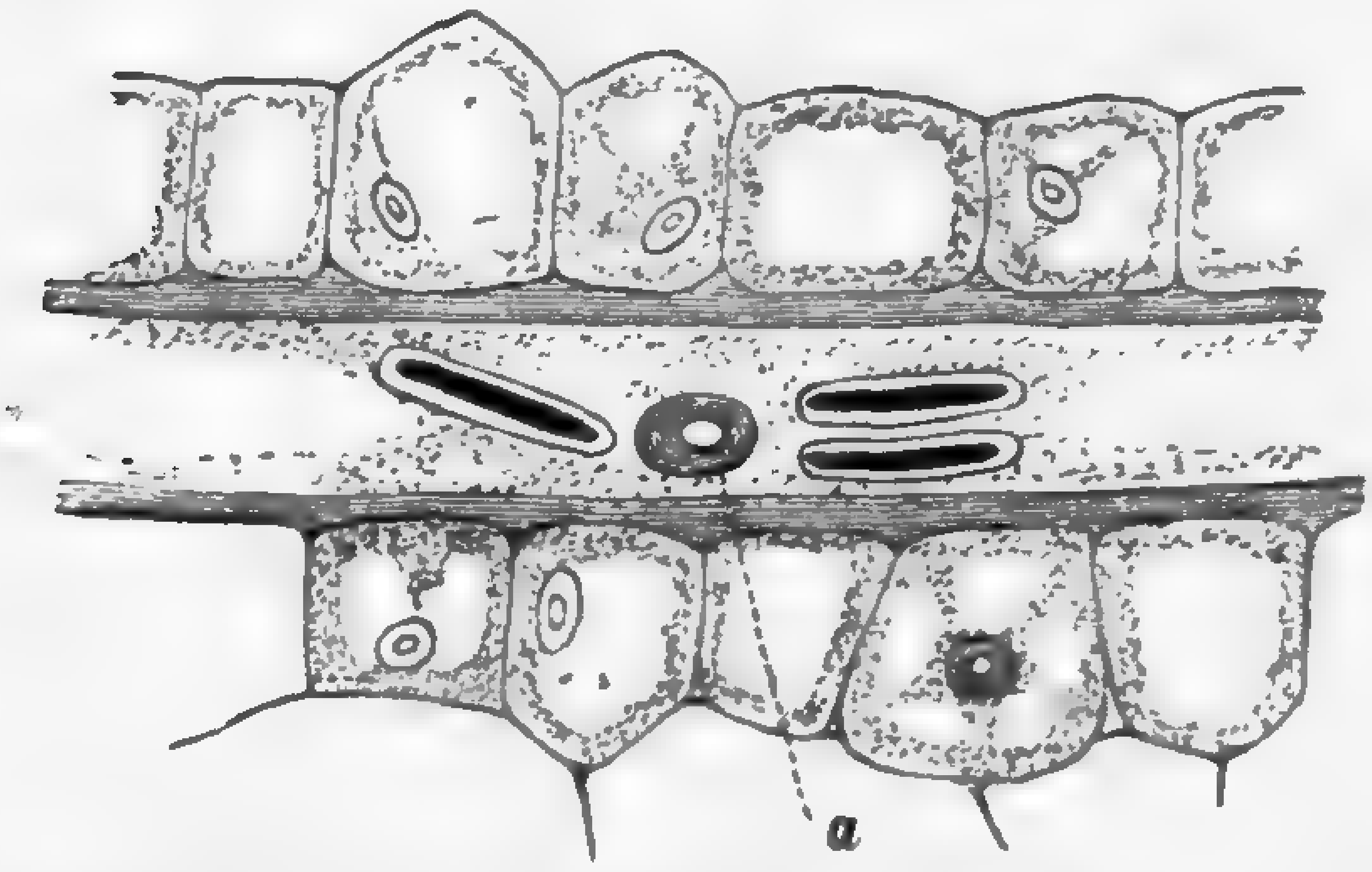


Fig. 2.

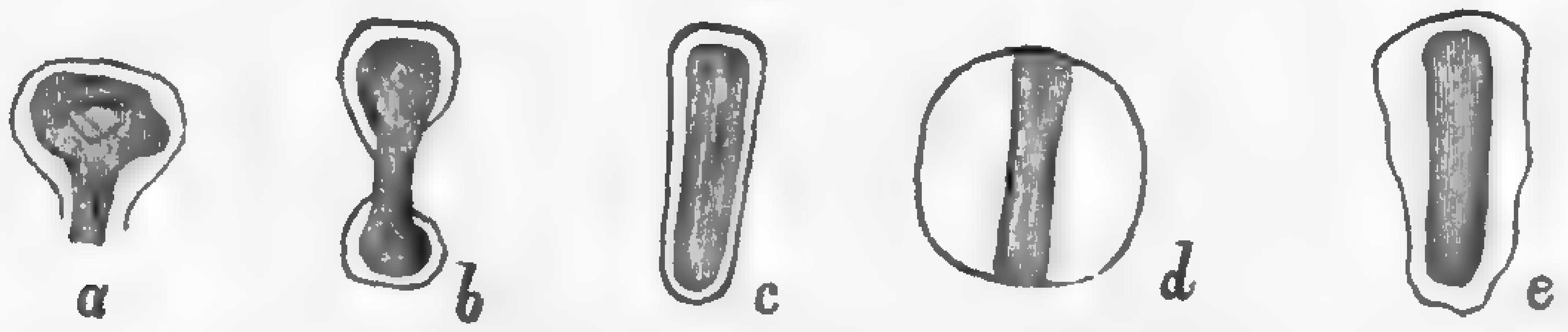


Portions of laticiferous cells in *Euphorbia splendens*. *a*. Nuclei. The other elongate dark-centred cells (unlettered) represent starch-grains enclosed in the starch-forming corpuscle.

The formation of starch on parts of plants not green has been investigated by Schimper*. He finds that the starch-grains on these parts are formed by deposition through the agency of starch-forming corpuscles. In polyhedral cells, where the nucleus is suspended from the parietal layer of protoplasm by strands of protoplasm, the starch-forming corpuscles are generally differentiated out of the layer of protoplasm which surrounds the nucleus, and consist of modified protoplasm.

The starch is formed either in the interior of the starch-forming corpuscle (*Colocasia*, endosperm of *Melandrum*) or in the peripheral parts (*Philodendron*, *Amomum*, *Phajus*, *Canna*). After the first formation of the starch, the starch-forming corpuscle for some time increases in size, the starch at the same time being enlarged. When, however, the starch-forming corpuscle has attained its maximum size, it continually decreases and finally disappears, the starch-grain constantly being enlarged as long as any part of the starch-forming corpuscle remains in contact with it. The starch-grains formed in this manner are usually excentric; the broader part being caused by a more active deposition of starch, is that part which is in contact with the starch-forming corpuscle; and consequently the hilum, which is that part of the grain which is first formed, is in that part of the starch-grain which is furthest removed from the starch-forming corpuscle.

Fig. 3.



a, *b*, *c*. Starch-grains enclosed in starch-forming corpuscle, which in *a* and *b* has contracted except towards the extremities of the rod. At *e* the starch-forming corpuscle is partially swollen, and at *d* much more swollen.

In tracing the development of the rod- or bone-shaped grains of starch of the Euphorbiaceæ, I find that they are developed in the interior of rod- or spindle-shaped starch-forming corpuscles, which lie in the parietal protoplasm of the cell. The starch-grain is at first visible, through the agency of iodine, as a thin streak in the interior of the starch-forming corpuscle. This streak, through the deposition of starch, assumes a rod- or spindle-shape; it increases in length and breadth, the starch-forming corpuscle at the same time increasing. When the starch-grain has attained nearly to its maximum dimensions in length and breadth, the starch-forming corpuscle collects at both ends of the rod-shaped grains, and there forms the masses of starch at the end of the rod, causing it to assume its remarkable shape resembling a bone. The bone-shaped grain formed in this manner consists of a cylindrical rod two to three times longer than broad, having at its ends masses of starch of irregular semicircular form, their diameter being often nearly three times that of the rod. These masses of starch deposited at the extremities of the rod are not hemispherical, but semicircular disks with a very irregular outline (fig. 4).

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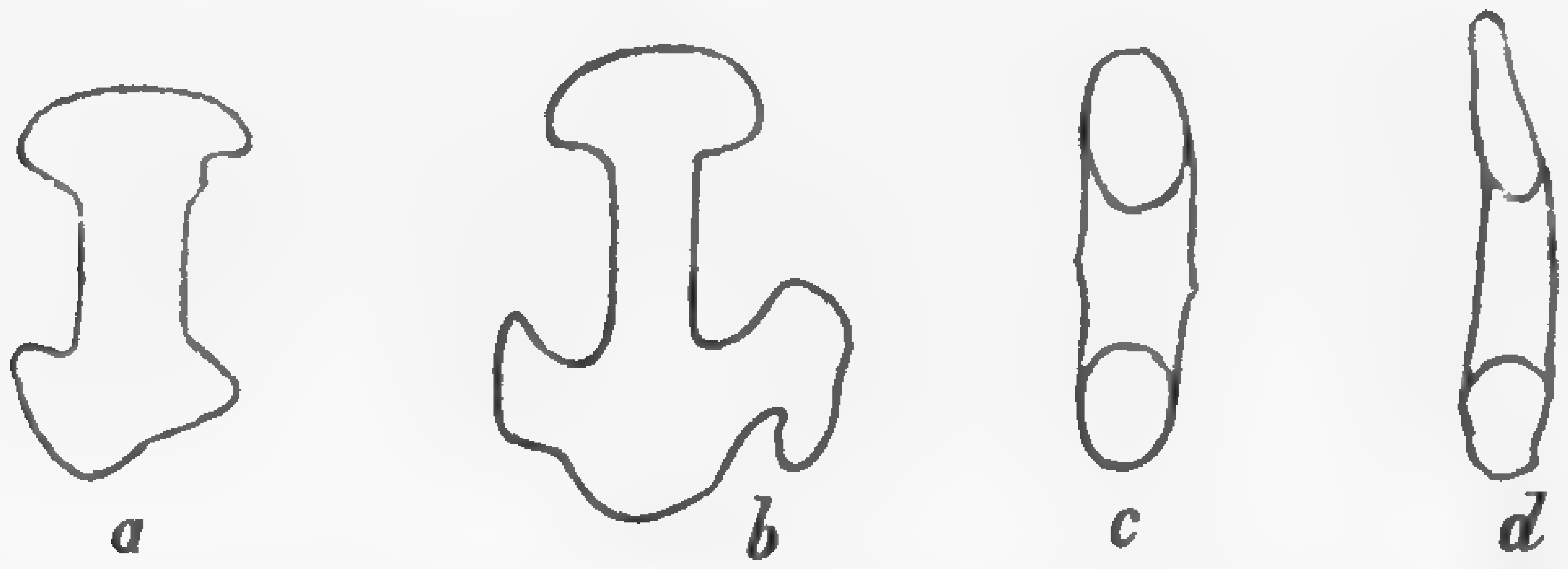
* Bot. Zeitung, 1880 and 1881.

Fig. 4



a and *b*. Mature starch-grains seen from above; *c* and *d*, seen from the side.

The laticiferous cells are polynucleated *, and since, when very young, their diameter does not much exceed that of the nuclei, it follows that the starch-forming corpuscles, which are formed always near a nucleus, must be formed on either side of it (figs. 1 & 2).

The smallness of the diameter of the laticiferous cell necessitates the starch-forming corpuscle being much longer than broad, and hence it comes that the primitive shape of the grain should be that of a rod. Later, however, when the laticiferous cell has increased in diameter, the starch-rod can also increase its diameter. This increase in diameter is not uniform over all the rod, but confined principally to its extremities, where the starch-forming corpuscle has collected and formed the irregular disk-shaped masses.

Crüger states that he could find no stratification or polarization-cross in these starch-grains. As regards the stratification, Nägeli † says it is indistinct, and Poulsen ‡ recommends the use of a dilute solution of chromic acid in order to render this structure visible. This reagent swells the starch-grains; but the stratification is still indistinct, is hard to observe, and is roughly parallel to the outline of the grain, the hilum being seen as a line in the centre of the grain in the direction of its long axis. As regards their optical properties, these starch-grains are doubly refractive; they do not, however, give a black or white cross as other starch-grains. When the prisms of a polarizing-microscope are turned so as to give a black field of view, then in the centre of the starch-grain one sees a black line surrounded on both sides by white lines; and, similarly, when the prisms are turned so as to give a white field of view, a white line surrounded by black ones. We see that, in all respects, these starch-grains agree with ordinary starch-grains, since they are developed in the interior of a starch-forming corpuscle, and by its agency they are stratified and are doubly refractive. The hilum, which is that part of the starch-grain which is first formed, appears when the grains are swollen as a line, and the lines of stratification enclose this and are roughly parallel to the outline of the grain, thus affording a proof that the development proceeds as in the manner above described.

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* Treub, "Sur des cellules végétales à plusieurs noyaux," Archives Néerlandaises, 1880.

† Pflanzenphysiologische Untersuchungen. Heft 2: Die Stärkenkörner, page 24.

‡ Botanical Micro-chemistry, by V. A. Poulsen, translated by W. Trelease page 85.

From the abstracts given above from Crüger's paper, we see that, with the exception of the Euphorbiaceæ, he had discovered the existence of the starch-forming corpuscle, though he had not understood its meaning, since he regarded it, not as an active agent in the formation of starch, but as an intermediate substance in its formation made by the protoplasm or chlorophyll-corpuscle. That he should not have seen this body in the laticiferous cell of *Euphorbia* is surprising; for it is plainly visible when latex from near the end of a growing shoot is examined with a microscope; the starch-grains lying in it are seen (fig. 3, *a*, *b*, *c*) enclosed in the starch-forming corpuscle. On treatment with water, the starch-forming corpuscle swells up (fig. 3, *d*).

On the Organs of Secretion in the Hypericaceæ. By J. R. Green, B.Sc., Scholar of Trinity College, Cambridge. (Communicated by Dr. S. H. Vines, F.L.S.)

[Read December 20, 1883.]

(Plates XXXIX. & XL.)

The natural Order Hypericaceæ is conspicuous among flowering plants on account of the numbers of secreting glands, resin-passages, and reservoirs of ethereal oil which are formed in the tissues of its species. The genus *Hypericum*, from which the Order takes its name, is the most noteworthy in this respect. Casual inspection of many of the commoner species of this genus shows that their leaves are studded with minute translucent dots, giving them a remarkable appearance when viewed by transmitted light. If almost any part of the plant be bruised, a peculiar fragrance may be observed, due to the escape of the ethereal oil or resin with which the tissues abound. In the ripe fruits of most species this resin may be observed oozing in considerable quantity from any wound. Besides the translucent dots there may be seen others of dark purple colour, almost black indeed, which are not so generally distributed, but yet are scattered about many parts of the plant. They are especially prominent on the floral leaves of *H. hirsutum*, where they are placed each on a kind of tooth or projection of the leaf, and form a row of knob-like bodies along its margin. In *H. perforatum* they are conspicuous in both floral and foliage leaves, generally being arranged at short distances from each other around the margin, but not so regularly as in the other species named, and not being in projections of the leaf. In some cases, especially on petals, these black bodies take the form of irregular patches, often of considerable extent.

In some species, such as *H. calycinum*, *H. pyramidatum*, *H. hircinum*, &c., which have thick, somewhat leathery leaves, with pellucid veins, there seem at first sight to be none of these translucent dots. In consequence, the genus has been roughly divided into two sections, marked respectively by the presence or absence of them. The division is not, however, an accurate one, for their apparent absence from the species forming the one section is due to their being situated under certain layers of the mesophyll of the leaf. If the chlorophyll be removed from these overlying mesophyll-cells, by the action of alcohol or other solvent, the translucent specks appear. Their position in the leaf in these species contradicts a statement made by Unger*, that only in *Myoporium tuberculatum* do oil-secreting glands occur as a rule in the midst of the leaf-tissue. Such bodies appear therefore to be present throughout the genus *Hypericum* (compare figs. 12 and 14, Pl. XXXIX.). They are distributed over leaves, bracts, and sepals, and in some species, as in *H. balearicum*, over certain parts of the stem.

Taking the Order throughout, four distinct kinds of secreting-organs are to be found, but not necessarily all in one plant, for certain of them are absent from some species. The most prominent of them are the pellucid dots referred to as chiefly characteristic of the leaves. These dots are hollow cavities, more or less spherical in shape. They extend, in the thinner-leaved species (as *H. perforatum*, *H. tetrapterum*, &c.), throughout the whole width of the mesophyll of the leaves, and hence touch the epidermis at both surfaces (fig. 12). In the thicker-leaved species (*H. calycinum*, &c.) they are imbedded more deeply in the tissue, and encroach on only part of the mesophyll (fig. 14). Their situation, and the consequent fact that they are covered by layers of cells containing chlorophyll, account for their apparent absence when the leaf is looked at before treatment with a solvent of the colouring-matter.

These hollow cavities contain in all cases ethereal oil, the escape of which, on the rupture of the epidermis over the reservoir, causes the fragrance alluded to.

The second kind of secreting-organ is to be found in the petals, sepals, and fruits, and in the stems of the different species. From the stems of some species, such as *H. balearicum*, these bodies are absent, being replaced by reservoirs that may be included in the first class. In stems that have not the spherical reservoirs, these organs of the second kind are abundant. They take the form of true resin-passages, which occur in the cortex and the pith, but are not found in the fibrovascular system. They are rather differently distributed in the stem and in the fruit, and their course is different in the two regions. In cylindrical stems they are generally disposed in a single row in the cortex, some few layers of cells below the epidermis, and they are separated from each other by considerable distances. Some stems have a rhomboidal outline in cross section. In these a passage is present in each angle of the rhomboid. Longitudinal sections show that they are placed parallel to the long axis of the stem, and that they do not anastomose. Besides these in the cortex there are others in the pith, irregular both as to number and position, which have a direction parallel to those in the cortex. In the fruits, on the other hand, they are not so regularly disposed. In the thicker-walled ovaries, as those of *H. calycinum*, instead of one row seen in a transverse section, there are several, the exterior ones being generally the older; in the thinner-walled fruits, as those of *H. perforatum*, there is but one row. Where many rows are present they are most numerous near the outer wall, fewer near the inner one, while the intermediate space is nearly free from them. Unlike the passages of the stems, these are not arranged in straight lines, but are curved irregularly and anastomose with each other frequently. Similar passages are found in the sepals and some of the petals of *H. calycinum*. The peduncles are supplied exactly as the stems, but the roots do not contain them.

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* 'Anatomie und Physiologie der Pflanzen,' p. 213.

In a third category are included all the dark spots, dots, or patches met with on the leaves, both floral and foliage, of many species. Though of very frequent occurrence, they are not so universally present as are the two former kinds. On the leaves of *H. perforatum*, in particular, they are disposed more or less regularly round the extreme edge, though there are others irregularly scattered over the lamina. In *H. hirsutum* the sepals are coarsely sinuate in their contour, and between the sinuses there are well-marked pointed teeth. The apex of each such tooth contains one of these glands, and, as the teeth are very small, at first sight each seems to resemble a glandular hair. On the petals also in this species are from four- to six-stalked projections, which are situated close together at the summit; these contain glands resembling those of the sepals. In *H. perforatum* dark patches of very irregular contour are found on the petals, generally elongated in the direction of the fibrovascular bundles. Though not always so dark in colour as the glands in the leaves and sepals, they have the same structure, and hence belong to this section. Similar structures occur in the petals of other species.

The fourth kind of secreting-organ is much less generally distributed. It takes the form of narrow passages, observable only in the young phloëm of certain species.

The mode of origin of the cavities of the oil-reservoirs has been for a long time a matter of controversy. Two views have been maintained, and both have had many advocates. According to some they are merely a modification or extension of intercellular spaces; while others hold them to arise from absorption of masses of cells. That they are of schizogenous nature was first advanced by Kieser*, who, writing in 1812, says that they are intercellular passages and arise from intercellular spaces. Meyen, in his work 'Ueber die Secretionsorgane der Pflanzen,' published at Berlin in 1837, takes the same view, which has also been advocated by Von Mohl. In later years this mode of origin has been ascribed to them by Frank †. Writing in 1868 upon the glands of *Myrtus* and *Hypericum*, he describes his method of investigation. In the former genus, to which he paid most attention, he cut sections parallel to the surface of the leaf and mounted them in glycerine. He says that the glands originate as a single rather large cell, having granular contents. This cell divides by three walls at right angles to each other, forming eight cells, which separate from each other at their common apex. Into the space so formed the secretion is poured, and thence it makes its way towards the periphery of the gland, forcing the cells apart. Coincident growth made the cells flatter, so that the gland became a spherical cavity, lined by the cells. The number of these increases by division of one or more of them. Having thus described the origin of the glands in *Myrtus*, he argues the same mode of formation for those in *Hypericum perforatum*, from the analogy of the clear spaces in that plant with those in *Myrtus*. Investigation into his method of working at *Hypericum*, however, shows that there was room for much error to enter into his conclusions. He did not examine sections, as he says he could not cut them parallel to the surface, the leaves being too thin. He mounted young leaves in glycerine, when, he says, the epidermis was transparent enough to let him see the stages in the formation of the gland. He has figured what he took to be the condition of the octants at the moment of their separation from each other.

In 1882 a paper was contributed to the S.B. k.-k. Akad. Wiss.

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* 'Mémoires sur l'organisation des Plantes' (Haarlem, 1812), p. 107.

† 'Beiträge zur Pflanzenphysiologie,' p. 124 *et seq.*

Wien by Dr. F. R. von Höhnel upon the structure of glands, in which he goes more into the details of the manner in which they originate. He agrees with Frank as to the schizogenous origin of the cavities. Of the species of *Hypericum* he worked chiefly at *H. perforatum* and *H. montanum*, in both of which he describes two kinds of glands, the pellucid and the dark-coloured. He says these differ further in the contents of the cells of the latter being solid. Both are of similar construction and mode of origin, arising from young mesophyll-cells abutting on one or other epidermis. Those which, in the thicker-leaved species, lie deeper in the tissue, arise from cells farther from the epidermis. He goes on to describe the mother cell of the pellucid gland as dividing by walls in several directions till fifteen to twenty-five cells are present, which then separate from each other in the middle of the mass, and into the space so formed the secretion is poured. The adult gland in *H. perforatum* he describes as having a one-layered epithelium consisting of many thin-walled cells.

The first advocate of the view that the cavities of these organs arise from absorption of cells was Link, who wrote in 1843. He says the glands originate as masses of tissue. Later, in 1872, Martinet published an elaborate paper in the 'Annales des Sciences Naturelles.'* In this he draws attention to what he calls the phenomenon of resorption, describing it in detail as seen in the glands of *Dictamnus Fraxinella* and in those of various species of *Citrus*. Speaking of the formation of these latter bodies, he says they arise as a group of thin-walled cells, smaller than the surrounding tissue, and having very granular contents. The gland so originating grows, and the component cells also grow, compressing the tissue. Then absorption of the cells commences at the centre of the nearly spherical mass, and advances slowly to the periphery. He says the glands of *Hypericum* are analogous to those of *Citrus*, and that their cavities are formed in precisely similar manner. In dealing with the dark glands, he says that these, like the others, produce an essential oil, being here at variance with Von Höhnel, who says the contents of their cells are solid.

The lysigenous view is also taken by De Bary (Anatomie, p. 218).

In considering the results of my own investigations into the details of the formation of these glands and passages, it will be most convenient to take first the second class, the resin-passages in the stems and flowers. Their situation in the different parts of these has already been described. They are to be found in both the thick-leaved shrubby species and in those of more slender habit, but are best traced in *Hypericum calycinum*. Each passage in the stem arises independently, a little below the growing-point. Their first appearance may be noticed about the same time as that of the differentiation of the procambium bundles, or perhaps a little later. The fundamental tissue in which they arise, two or three layers of cells below the epidermis, is composed of cells which in cross section are polygonal and in longitudinal section are oblong, about five times longer than their transverse diameter. In the midst of such cells rows of cells appear, at first single in cross section, which begin to divide differently from their neighbours, while their protoplasm becomes more granular and stains more deeply. Soon the single cell is found to have divided into two, each of these again into two, and then, by irregular divisions, into a larger number of cells, forming a strand of tissue, which, in longitudinal section, is seen to consist of small oblong cells with very delicate walls and very granular contents, the nucleus being well marked in each (Pl. XXXIX. figs. 1–4 and fig. 9). Such a section at this stage generally shows about three or, at most, four rows of such cells forming the strand. They are about one fourth or one fifth the length of the cells of the fundamental tissue which surround them, and about half as broad. As the stem in its growth lengthens, the differentiation of the strand accompanies it, and the secreting-organ thus follows the elongation. The thickening of the strand of cells causes it to press on the cells of the fundamental tissue, and hence in its immediate neighbourhood these are smaller and somewhat flatter than those which surround it when younger. After, by repeated divisions, the cross section of the strand has come to consist of about twenty cells, the tissue in its centre is found to be somewhat looser than it was when younger (fig. 5). Intercellular spaces in the strand are more marked as the growth proceeds (fig. 6). In fact, almost all through its development, the cells are found not to be in close contact throughout. In some sections, when as few as three or four cells constitute its thickness, small intercellular spaces may be seen at their point of union (figs. 2 and 3). From the time, however, when the section shows twenty or more cells, another process becomes evident. Not only does the strand contain interspaces, which, as the passage still grows in diameter, extend throughout it irregularly (fig. 5), but the cells themselves break up and disappear. Just before this dissolution their contents have become more coarsely granular, and small aggregations of the resinous secretion may be recognized in them. The disintegration of the tissue begins where the intercellular spaces have first made their appearance, and generally the centre of the strand is the first part to go. Cavities thus are formed in the strand of cells, and these contain the secretion which was in the cells that have broken up. These cavities are not regular in their distribution, two or three sometimes appearing in the cross section (fig. 6). In some cases the appearance is that of a central cavity crossed by rows of cells of irregular form and unequal sizes. Generally at this stage the peripheral cells are intact, but sometimes one or more of these may be missing (fig. 6). The process of disintegration proceeds further, advancing, speaking generally, from the centre to the periphery. The next stage is shown at fig. 7, where all the central cells have disappeared, and the passage appears as if lined by an epithelium of secreting-cells. In the resin-passages of the stem this layer appears to persist as long as the passages remain visible, the walls of the individual cell, getting, however, more delicate and their outlines less distinct as their age advances, while the cells become more and more flattened. In the passages in the ovary the disintegration goes further, for sections through ripe fruits show some of the passages lined apparently only with a little débris, resulting from the breaking-up of this quasi-epithelium (Pl. XL. fig. 20). At the stage shown in fig. 7, the resin-passage in the stem is at its highest point of development. Meanwhile the cells of the fundamental tissue are being changed from their original condition, their walls thickening considerably. Instead of the passage continuing now to press upon these cells, the direction of the tension is reversed, the now yielding tube becomes smaller and smaller in diameter (fig. 8), till gradually it ceases to be recognizable, and, at the time when the fibrovascular tissue is well differentiated, no resin-passages can be identified. The formation of the secreting tissue hence is confined to the primary meristem, and the cambium does not give rise to any.

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* "Organes de Sécrétion des Végétaux," Ann. des Sc. Nat. 5^{e} sér. vol. xiv.

The origin of the passages in the ovary is similar to that in the stem. The main difference between the two parts is the much greater abundance of them in the ovary. As already stated the ducts are in several rows, and they anastomose frequently with each other (Pl. XL. figs. 18 & 19). In the ovary of the thin-walled species they arise from cells close under the epidermis, the cells of which are slightly smaller just over them. As the fruit grows, the epidermis-cells which do not overlie the passages grow also, keeping about the same relative size; but those which abut on the secreting tissue remain small, so that a depression on the surface corresponds to a passage (fig. 21). In the thick-walled ovaries, as the wall thickens fresh passages are developed in it continually. Consequently a great amount of resinous exudation is noticeable in cutting such a fruit. There is in these no modification of the epidermis. In the thin-walled ovaries the passages may extend quite through the mesophyll and touch the epidermis at both surfaces; or they may be of less diameter and abut on only the outer one. Though they are always in contact with the epidermis, the latter takes no part in their formation, as, according to Martinet*, it does in the similar glands of *Dictamnus*.

In the floral leaves of the species of stouter habit there are similar passages. In the sepals often several rows may be found, which differ in no way from those of the ovaries. The petals show a rather remarkable distribution. The æstivation of *Hypericum calycinum* is convolute; when the flower begins to expand the sepals open some little time before the petals, and leave these latter twisted round and covering over the essential organs of the flower. The centre of the whorl of sepals is therefore occupied by a small knob-like body of bright yellow colour and glaucous appearance, which is composed of the stamens and pistil covered over by the contorted petals. On opening out the separate petals, each is found to be of very different texture at its two lateral edges. The part which was outermost in the coil is fitted for its protective functions by being thick and firm, and having an epidermis whose cells are strongly cuticularized. The side which in the twisting was in contact with the stamens, and was therefore covered over and kept from the air by the thicker portion, is thin and delicate, with a somewhat papillose epidermis whose cells are not cuticularized. The two kinds of structure gradually blend one into the other at about the middle of the petal. In the thick part there are many passages arranged parallel to its long axis, most of which are seen in transverse sections to be near the surface exterior in the unexpanded flower. Some are near the other surface, while the middle of the tissue is nearly free from them. In the centre of the petal, where the tissue is becoming thinner, the passages are less numerous and lie almost in the centre of the mesophyll, but slightly nearer the underside. At a certain distance from the thick edge only one row of passages is formed, and at this part of the petal the cuticularization of the epidermis becomes indistinguishable. From the thinnest part of the petal, where the structure is that of ordinary soft petals, the passages are altogether absent. In the petals of *H. perforatum* a few passages run up for some little distance from the base. They can be seen best in petals of buds taken a little while before the flower expands. In the mature petals of this species the cavity of the passage seems to have been obliterated.

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* *Loc. cit.*

The glands or reservoirs of ethereal oil in some respects resemble pretty closely these resin-passages, but differ in form and in the nature of their contents. They are present apparently in all the species; but they are of very different dimensions, being largest in *H. balearicum*, of medium size in *H. perforatum* and *H. calycinum*, and small in *H. Androsæmum*. The most remarkable of them perhaps are those of *H. balearicum*, which, instead of being sunk in the tissue as in most species, project with their covering of cells in the form of warts on both stem and leaf. In the thick-leaved species they do not affect the condition of the cells of the epidermis; but in *H. perforatum*, *H. tetrapterum*, &c., in which they abut on this tissue, the epidermal cells immediately over the glands are much smaller than the normal ones (fig. 12). They arise in the same manner as do the resin-passages, and at about the same time in the differentiation of the leaf, *i. e.* at about the time of appearance of the young procambium bundles. A mass of cells is soon distinguishable, which from the first is in contact with the epidermis. It appears in the thin-leaved species before the mesophyll of the leaf has become differentiated into palisade and spongy tissues (figs. 10 & 11). In the thicker-leaved ones such differentiation can at this time be observed, and the gland is seen to encroach most upon the palisade-parenchyma (fig. 13). The glands increase in number as the leaf develops, fresh ones being continually formed in the region of most vigorous growth. The cells, as the gland is developing, are polygonal in form, have very thin delicate walls, and finely granular contents. On treatment with osmic acid the granules stain black; with iodine they do not stain, but the rest of the cell-contents are coloured yellowish brown; with aniline colours the contents of these cells stain much more deeply than those of the neighbouring cells. The number of cells going to form a gland varies very much, the size of the gland depending almost entirely on the number present, as the cells of those of different species are of about the same size. In sections of the glands of *Hypericum perforatum*, *H. calycinum*, &c., there are from eight to fifteen generally visible, while in those of *H. balearicum* the number is too great to admit of ready counting (compare figs. 10, 11, 13 with fig. 22). When the full number of cells has been reached the gland is still increasing in size; the phenomenon of absorption takes place just as in the resin-passages (compare figs. 11, 12 with figs. 6, 7). At this time the secretion, which in the younger cells could be seen as small granules, has much increased in quantity and composes nearly all the contents of the cells. On absorption of the latter the ethereal oil occupies the cavity of the reservoir so formed. With increasing age the cells disappear more and more completely; but they are never all absorbed, for an external layer remains and forms a kind of epithelium.

In the oldest reservoirs the internal walls of these cells apparently disintegrate. Unlike the resin-passages, these reservoirs are never obliterated by subsequent changes taking place in the leaves.

A peculiar appearance which the glands of *H. balearicum* present is figured by Unger in his work before referred to. Cells of the glandular tissue left lining the cavity after absorption is nearly complete grow out into the interior of the reservoir in the form of hairs or papillæ, which he figures as being multicellular. I have not seen in any that I have examined such large ingrowths as Unger figures, but have observed several consisting of a row of two or three cells, and have seen glands with hairs growing out from nearly the whole of the inner surface. When the process of absorption of the cells of the gland begins, as in other species, the central cells are the first to go. Their protoplasm has almost all disappeared when they begin to break up. The cells nearer the periphery of the gland are at this time younger and contain more protoplasm. When the pressure on any one of them is relieved by the absorption of the central cells it grows out into the space formed, becoming rounded on its free surface. The growth is, however, but slight, and the cell by this process and by the continuance of its secretive activity soon loses the rest of its protoplasm, is charged with the secretion, and breaks up. So the progress of the absorption of the tissue is more rapid than the compensatory growth of the cells, and the cavity extends more and more towards the periphery. The outermost cells, however, are more vigorous than the others between them and the centre, and the last layer never disappears. Its cells grow out into the cavity of the gland as the others have done on the removal of the pressure; and their activity being greater than that of those, they not only grow out but divide, forming the papillæ Unger has figured. All the cells of this last layer seem to behave in this way. I was not able to trace whether the process went further than this, but it seemed from some sections not unlikely that the end cells of the hairs broke up like the original central cells. Possibly, by this means, a continuous process of secretion goes on. These appearances occur both in leaf and stem. In the former, fine branches of the fibrovascular bundles come into relation with the glands at some part or other of their surface, but do not enter them. In the stem the glands show no relation to the vascular-bundle system, being situated in the cortex. The papillæ do not grow into the glands of the ovary; and here, too, no relationship between them and the vascular-bundle system obtains.

The dark glands, the walls and contents of whose cells are of a violet colour, occur in both floral and foliage leaves of some species, while they are absent altogether from others. They are spherical in form in the bracts and sepals of *H. hirsutum*, spherical to ellipsoid in the petals; both spheres and ellipsoids are found in the leaves of *H. perforatum*, the former being perhaps the most numerous. On the petals of the same species they are very irregular, taking often the form of clavate patches which are parallel to the fibrovascular bundles. They are situated generally nearer to the under than the upper epidermis of the leaf.

They differ markedly in one particular from any of the glands hitherto described, in that they are always placed in direct relationship with the fibrovascular system. Wherever met with in the green tissue, a fibrovascular bundle runs to them and generally ends abruptly close to the glandular tissue, never, however, penetrating it. They thus resemble many other glands occurring in different plants. Martinet describes* similar structures in the ovary of *Dictamnus Fraxinella* which are borne on processes of the carpellary leaves. These, he says, consist of an epidermis enveloping a mass of cellular tissue, in the midst of which is a spiral vessel running to the gland but not entering it. The glands of *Drosera rotundifolia,* described by Darwin †, show a similar relationship, as do the water-glands of *Saxifraga incrustata* ‡. Their development is most easily traced in the very young sepals of *Hypericum hirsutum.* The youngest tooth of such a sepal is drawn in fig. 15, Pl. XXXIX.: it consists of an epidermis clothing a mass of cellular tissue. The cells of all this mass are very delicate and transparent. One cell, just underneath the epidermis at the apex of the tooth, has a darker colour and its contents are slightly granular. From this cell the gland arises by divisions in irregular order (fig. 16). As the tooth grows the cells behind the gland multiply faster than those of the gland, and the latter is forced farther and farther outwards. While it is still developing, the tissue in the centre of the tooth behind the gland becomes differentiated and a fibrovascular bundle makes its appearance, forming a branch of the main fibrovascular system of the leaf. The cells of the external part of the spherical mass of tissue are somewhat flatter and narrower than the interior ones. The whole outer part of the gland is covered directly by the epidermis, which forms a kind of bounding layer to it (figs. 15, 16, 17). The cells do not undergo absorption as do those of the pellucid reservoirs, but persist through the gland's whole life. All through the time of their existence they are dark in colour, becoming darker, however, as they mature. There is, as a consequence of their persistence, never any cavity containing secretion, the latter continuing in the cells.

In *H. perforatum* the glands are not situated with the same regularity on the leaf. Generally a row of them is found round the edge, with several others irregularly scattered about it, especially near its apex. The same relationship with the fibrovascular bundles is maintained. The fibrovascular system is arranged in very fine reticulations, and branches of the ultimate network may be traced to every gland. In some cases they do not appear to end at the gland, but rather to pass close beneath or above it. In other cases the ending can be distinctly seen

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* *Loc. cit.* † 'Insectivorous Plants' (London, 1875), p. 6.

‡ Gardiner, Quart. Journ. Micr. Sci. 1881, p. 407.

(fig. 23). In this species the glands are not composed of so many cells as in *H. hirsutum*, but the individual cells are much larger.

The secretion of the glands is solid and of resinous nature. It is deeply tinged with a violet colouring-matter, which also stains the cell-walls. This colouring-matter is soluble in water, alcohol, and glycerine. Caustic potash also removes it and appears further to dissolve the resinous contents of the cells.

Certain orange-coloured or brown spots which appear on the sepals of *H. calycinum* may be confounded with these dark glands. These are, however, due to an accumulation of resin in the epidermal cells of these spots, and are not glandular at all.

The last description of secreting-organ differs from those already described in being undoubtedly schizogenous in origin. Slender passages or ducts may be observed in the young phloëm of the stem of *H. calycinum*, arising rather later than the resin-passages in the cortex and pith. Just after the first differentiation of the procambium, and consequently at a point in the stem very near the growing-point, their origin may be noticed. The whole mass of the procambium-cells stains more deeply than the cortical tissue, but the cells which are about to form the passage are distinctly darker than the others. I have no doubt that they arise from a row of single cells forming a strand, as in the case of the other resin-passages in the cortex; but I have not been able to detect in transverse section an earlier stage than that of fig. 24 (Pl. XL.), where the single cell has divided into two. This is soon followed by a further division of each of the two cells (fig. 25), and in the centre of these four so formed a separation takes place (fig. 26) which forms an intercellular space. The separation proceeds from this point towards the periphery, the space between the cells enlarging, and the cells themselves becoming flatter (fig. 27). They differ from those of the other passages in not dividing repeatedly to form a mass of tissue; in fact a section of the duct never shows more cells than these four lining its cavity. As the growth of all the tissue is vigorous at this time, the duct enlarges, and its constituent cells also increase in size, altering still in shape (fig. 28). They do not, however, keep pace in growth with the enlargement of the cavity but become gradually narrower. While the phloëm remains unaltered these ducts persist; but when the xylem begins to increase in thickness, the phloëm-layer becomes somewhat compressed and the walls of its cell are altered. Then gradually the passages become pressed upon, and finally they are obliterated in the same way as those described above as occurring in the fundamental tissue.

The results of my observations I may summarize briefly thus:—

1. The view advocated by Link, Martinet, and De Bary of the lysigenous origin of the reservoirs of ethereal oil in these plants is the correct one.

2. There exists in many parts of the plants a series of ducts or passages differing only slightly from these reservoirs; the differences being that they are not globular and isolated, but are generally connected more or less intimately with each other, and that their secretion is not a clear ethereal oil but a viscid or resinous liquid; the points of agreement being those connected with their development and function.

3. At least in some species, there is also a series of schizogenous ducts confined to certain portions of the phloëm.

4. The dark glands which have been described are in intimate relationship with the fibrovascular system.

5. The formation of resin and kindred secretions in these plants is confined to the parts where metabolism is active and where there is a primary meristem. That all such parts give evidence of such formation with the exception of the roots.

EXPLANATION OF THE PLATES.

Plate XXXIX.

Figs. 1–8. Showing development of resin-passage in the stem of *Hypericum calycinum*.

Fig. 9. A longitudinal section of portion of the stem of *H. calycinum*, with resin-passage about the same stage as in fig. 4.

Figs. 10–12. Showing development of glandular body in the leaf of *Hypericum tetrapterum*.

Figs. 13 & 14. Similar development observed in the leaf of *H. calycinum*.

Figs. 15 & 16. The same in leaf of *Hypericum hirsutum*.

Fig. 17. Longitudinal section of the dark gland in *H. hirsutum*.

Plate XL.

Fig. 18. Longitudinal section of the passages in ovary of *Hypericum calycinum*.

Fig. 19. Part of the same, more highly magnified.

Fig. 20. Transverse section of the ovary of *H. calycinum*, showing the final state of the passage.

Fig. 21. A transverse section of a passage in the ovary of *H. tetrapterum*.

Fig. 22. Young gland in the leaf of *Hypericum balearicum*.

Fig. 23. Showing the mature dark gland in the leaf of *Hypericum perforatum*.

Figs. 24–28. Illustrating the development of the passages in the bast of stem of *Hypericum calycinum*.

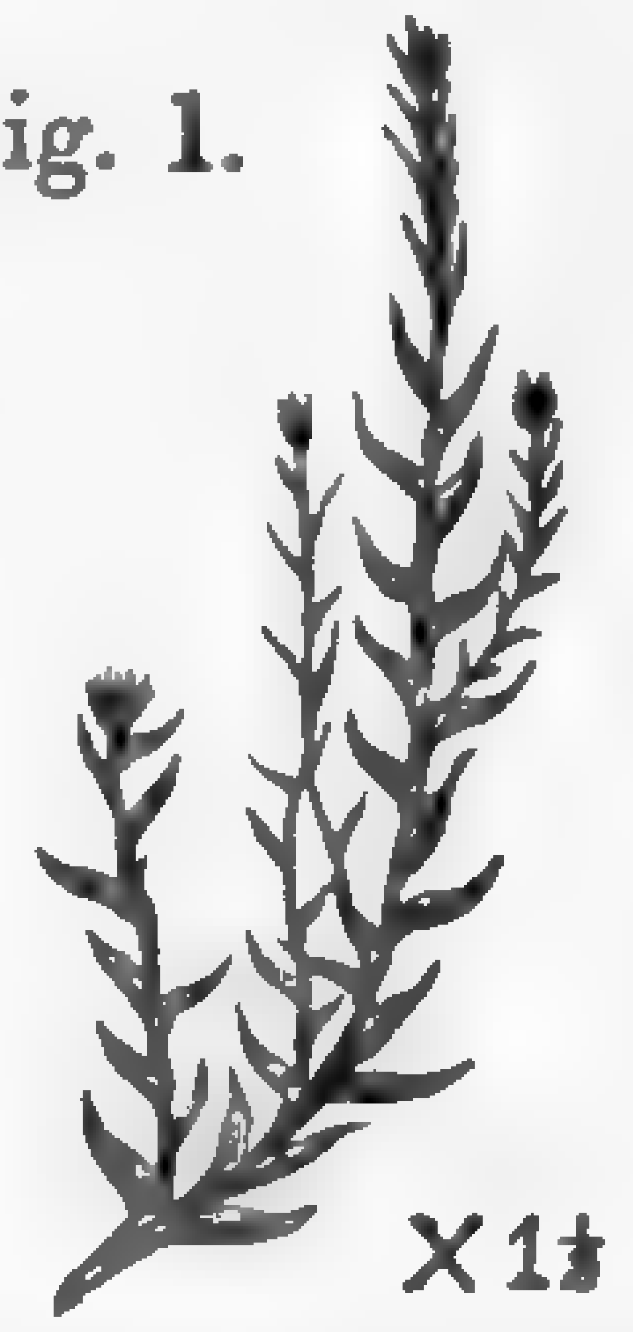
Note on the Gemmæ of *Aulacomnion palustre*, Schwægr.

By F. O. Bower, M.A., F.L.S.

[Read February 7, 1884.]

This moss was found in 1882 growing in considerable quantities in the propagating-pits at Kew, together with *Sphagnum*. Being there kept in a warm and damp atmosphere, it flourished well, but showed no trace of sexual organs. It was, however, found that the ordinary vegetative axes often bore towards their apices structures which are undoubtedly of a foliar nature, and show a special adaptation for effecting the asexual or vegetative reproduction of the plant.

Fig. 1.



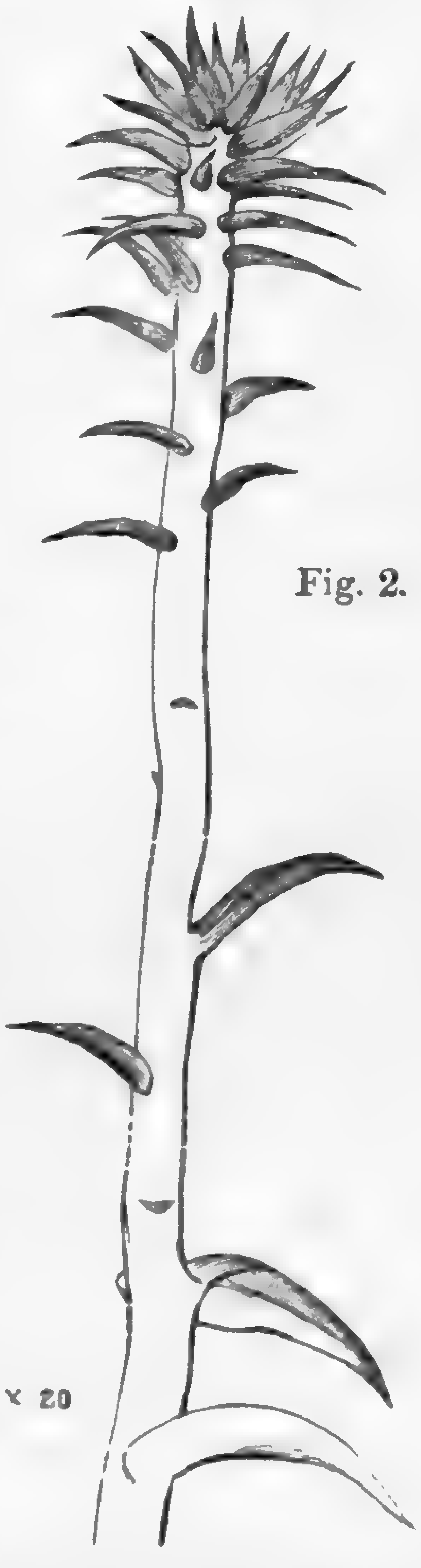
Aulacomnion palustre, the upper parts of the axes have developed as pseudopodia.

On passing upwards along one of these *pseudopodia*, as those axes of a plant are called which have begun to adapt themselves to this asexual reproduction, there is found a gradual transition from the normal oblong-lanceolate leaf, with broad base and thin lateral portions, to the leaf-gemma, in which the base is much narrowed, the flattened expansion reduced, and the whole body of a cylindrical or conical form. It may also be observed with the naked eye that the gemmæ are of a deeper green colour than the normal leaves; while under the microscope it is seen that the cells are more densely filled with reserve materials.

The leaf-gemmæ have a very narrow base, and, when mature, the cells at the point of attachment are found to be rounded off, as shown in figs. 3 and 4. They are thus well adapted for being thrown off; and they may be completely removed from the parent plant by a very slight mechanical disturbance.

After such removal, the gemmæ were found to be capable of immediate germination when laid on damp soil or floating

Fig. 2.



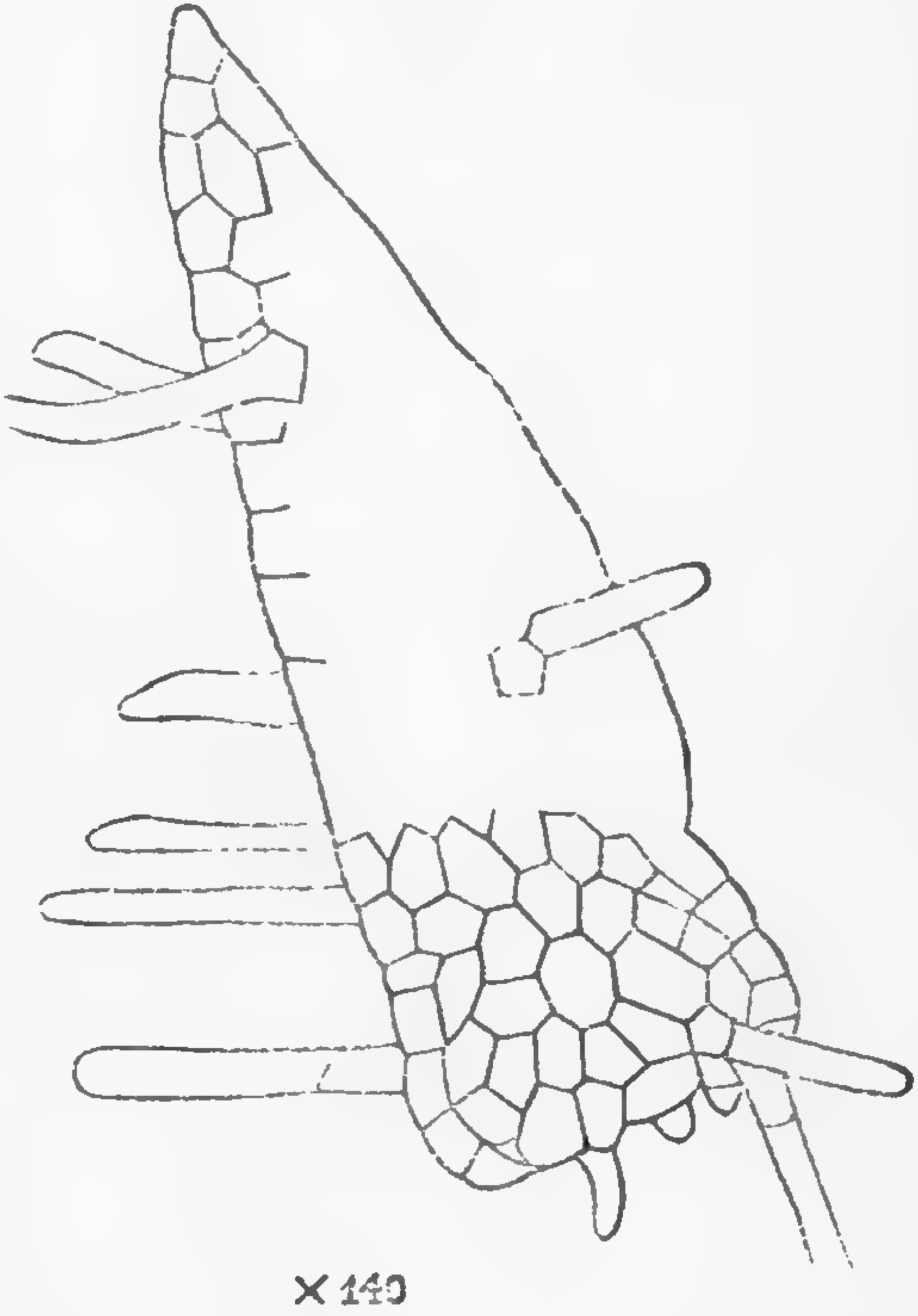
Pseudopodium, showing transition from the normal leaf to the leaf-gemma.

in water; in the latter case, however, only protonemal filaments were formed.

When sown on damp soil, normal protonemal filaments were found to be already developed from single cells of the gemma on the third day.

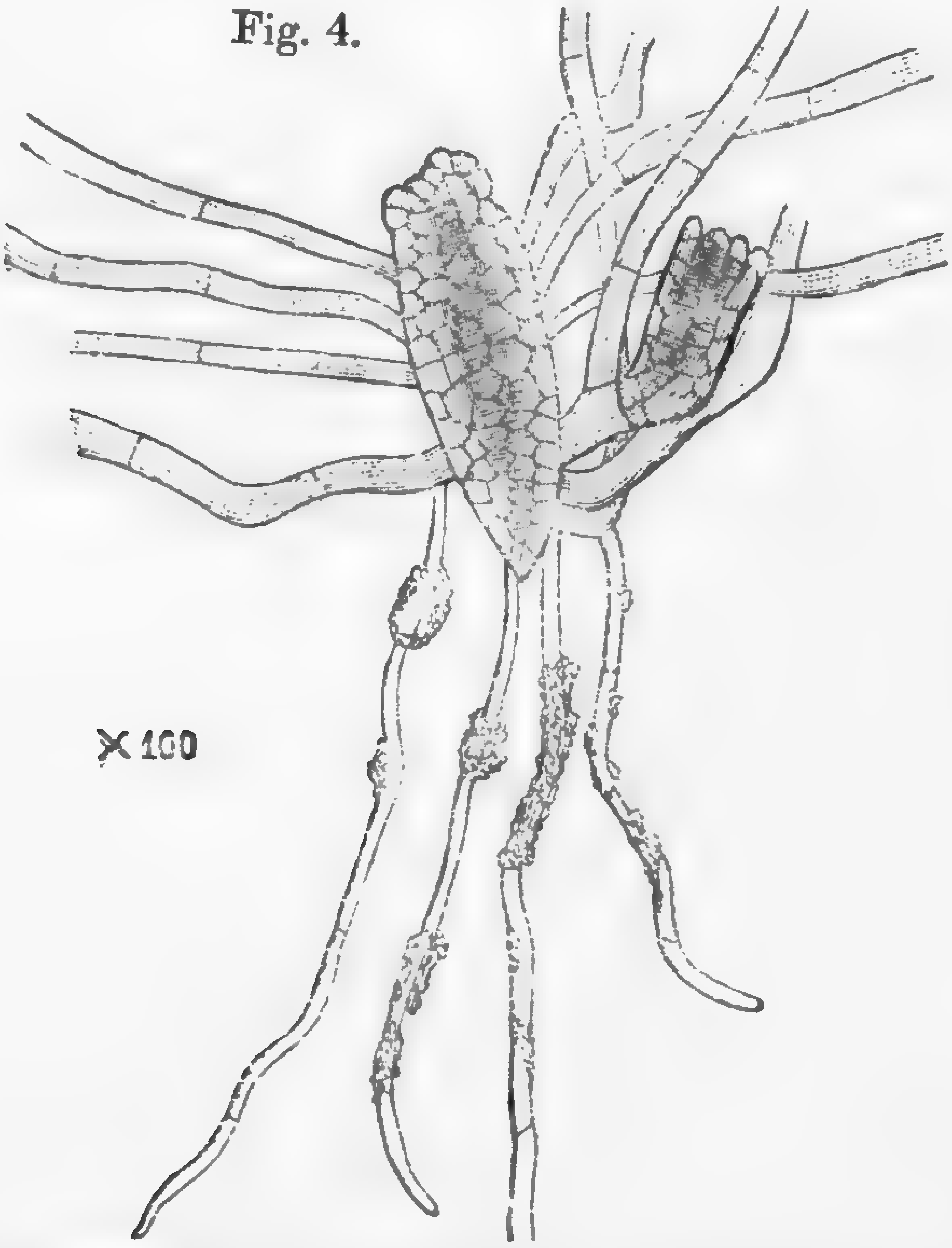
Apparently any external cell may grow out into a protonemal filament, their formation being restricted to no special part of the gemmæ (figs. 3 and 4). After the protonema has attained a strong development, a leaf-forming bud appears in the ordinary way upon it, at a point close to the gemma itself, and in no definite position relatively to it.

Fig. 3.



Gemmule of *A. palustre,* after germination for three days.

Fig. 4.



Gemmation of *A. palustre* in a further stage of development. The shaded filaments are green protonema, a leaf-bud is formed near the base of one of them. The filaments which are not shaded are rhizoids.

The pseudopodia were never seen to return to the mode of development of an ordinary vegetative axis with normal leaves.

This mode of asexual reproduction in *Aulacomnion palustre* is of interest when compared with that well known in *Aulacomnion androgynum* and *Tetraphis pellucida.* In these plants the structure of the gemma is simpler, consisting of but few cells, and it presents few points in common with the normal leaf. The specialization to perform the function of asexual reproduction is in fact more advanced in these cases, while the transition from the leaves to the gemmæ is a sudden one. In *Aulacomnion palustre* the specialization is less complete: the transition from the normal leaf to the leaf-gemma is in this plant gradual, and the modification of growth of the axis, which bears the gemmæ, is comparatively slight.

Contributions to South-African Botany.

By HARRY BOLUS, F.L.S.*

[Read January 17, 1884.]

ORCHIDEÆ.

DISA, HERSCHELIA, MONADENIA, *and* BROWNLEEA.

In the Society's Journal, vol. xix. pp. 235–236, I suggested the maintenance of the genus *Herschelia*, and relied, in part, for its distinction from *Disa* upon its bilobed stigma. Mr. Bentham also took the same view in the 'Genera Plantarum.' I have since found this character to be inconstant, several species exhibiting in some individuals a more or less well-marked third lobe. There are then left the characters of the trifurcate rostellum, and the single gland of the pollinia. With respect to the first of these, even were it rigidly confined to this group, I should regard it as too slight to be of generic value. Modifications of the rostellum are shown in the section of *Disa* referred to below, which I propose to call *Vexillata*, where it is prolonged behind into a fold beneath the anther. But besides this, there is a rudimentary third process, not so large nor so erect as in *Herschelia*, in *Disa obtusa*, Lindl.; and there are lateral tubercles, approaching those of *Brownleea*, in *D*. sp. (No. 4519 mihi). These facts show a tendency in the rostellum of *Disa* to variations which forbid our trusting to it alone for generic distinctions. With respect to the single gland of the pollinia, the remarks I am about to make respecting *Monadenia* will show why I think that must also be abandoned. I therefore propose to refer *Herschelia* again to *Disa*, of which it may be regarded as a section.

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* [Specimens of the Orchids described in the following paper were sent to Kew by Mr. Bolus, with the request that they might be compared with those in the Kew Herbarium, and also, if possible, with Thunberg's types of his 'Flora Capensis.' Through the courtesy of Professor Berggren, of Upsala, I have been enabled to examine Thunberg's types; and the result has been to show that some of the species deemed by Mr. Bolus to be new, are in reality species that were long ago described by Swartz and Thunberg. As, however, many of these old species have been misunderstood by Lindley and others, it has been thought advisable to publish the descriptions and commentaries given by Mr. Bolus, merely substituting the correct names for those he had proposed, and adding synonyms, additional localities, collectors' names, &c. Of Thunberg's Cape Orchids I propose to give an account hereafter.—N. E. BROWN, Herbarium, Kew.]

Monadenia was established by Lindley in 1838 as distinct from *Disa* by the single gland of its pollinia and its subequal fleshy petals. Most of the species have also the rostellum produced into lateral folds turning either forwards or backwards. In general habit they agree fairly well, and are somewhat different from the great majority of *Disæ*.

Mr. Bentham has admitted the genus with some apparent doubt, and in doing so has referred to a brief expression of my own in favour of its maintenance. Since that was written, I have examined living specimens of *Disa tenuis*, Lindl.*, in which I found the single pollinary gland of *Monodenia* joined with all the remaining characters of *Disa*. I have referred above to the uncertainty of characters derived from the rostellum; and there remains nothing but habit, which is not unexceptional, for *Disa bracteata*, Sw.† (besides having fleshy lateral petals, and glands approximate though distinct), has almost entirely the appearance of a *Monadenia*. Rather unwillingly, therefore, for the genus is already a large one and not easy to divide satisfactorily into groups, but, as it seems to me, quite unavoidably, I shall propose the union of

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* Lindley, working on a dried specimen, had not observed this. But Sonder, in his fuller description of *D. leptostachys* (Linnæa, xix. p. 98), which I have no doubt whatever is a synonym for the same plant [yes, certainly!—N. E. Brown], says "pollinia basi connata."

† [The plant here intended is *Disa cylindrica*, Swartz (*D. bracteata*, Lindley, non Swartz), as I have compared Mr. Bolus's specimen No. 4537 with Thunberg's type-specimen of *D. cylindrica*!, which is undoubtedly also *D. cylindrica*, Swartz. The *D. bracteata* of Swartz I have not seen; but from his brief description I believe it to be a very different plant.—N. E. Brown.]

Monadenia with *Disa*. I would keep it a sectional group, and include in it *D. tenuis*, Lindl., with its single pollinary gland.

Brownleea was established by Harvey in 1842 upon two eastern Cape species; and is chiefly distinguished from *Disa* by its side petals being adnate, or at least permanently adhering, to the galeate back sepal, and its labellum expanded at base into a pouch-like process embracing the column, and the limb upturned and reflexed over the stigma. Harvey pointed out its affinity with *Disperis*, which is very curious. By an unfortunate error, the galea is described in the 'Genera Plantarum,' Benth. & Hook. f., as spurless, besides some other discrepancies which lead one to think that the manuscript must have suffered some accidental change which escaped revision. Prof. Reichenbach has reduced this genus to *Disa* (Otia Bot. Hamburg, fasc. ii. part 1, p. 119), without giving any reasons for this step. I have only examined the flowers of three species freshly preserved in alcohol. These fully bear out the generic characters assigned by Harvey. I know of nothing approaching them in *Disa*, and they seem to me sufficiently valid. Without knowing every species of the genus, I would not challenge the conclusions of so experienced an authority; but without further knowledge I am not prepared to adopt them.

CYMBIDIUM.

CYMBIDIUM USTULATUM, *Bolus*, n. sp.; caule humili erecto folioso; foliis lineari-lanceolatis rigidis; sepalis lanceolatis acutis, lateralibus subfalcatis; petalis oblongis; labello circumscriptione ovato-trilobo, lobo medio rotundato reflexo papilloso, lobis lateralibus involutis, basi mento producto columnæ adnato; polliniis glandulæ subquadratæ diaphanæ medio affixis.

Totum glabrum, 2–6-unciale. Tubera plura, filiformia interdum ovata, 3–5 cm. longa, 0·3–0·5 cm. crassa. Folia acuminata, 2–5 cm. longa, nervulis crebre striata. Spicæ laxe 3–6-floræ, 2–3 cm. longæ, 2 cm. latæ, bracteis flores æquantibus vel interdum superantibus. Flores atropurpurei, fere atri quasi deusti. Sepala 0·7 cm. longa, 0·18 cm. lata. Petala 0·6 cm. longa, 0·25 cm. lata. Labellum (explanatum) 0·7 cm. longum, 0·5 cm. latum, lobo medio papilloso 0·25 cm. longo. Columna semiteres 0·6 cm. longa, basi in mentum excavatum producta. (*v. v.*)

Hab. In solo arenoso humido in clivis montis Muizenberg, Peninsula Capensi, alt. 1300 ped., æstate anni 1882 (mense

Decembri), copiose legi. In loco unico tantum vidi; nec in Herb. Gubern. C. B. S. exstat. Herb. meo No. 4848!

This is a very distinct species, its nearest congener being *C. aculeatum*, Sw., from which it differs in its rootstock, leaves, lip, and the peculiar uniform deep chocolate-coloured flowers.

Following Harvey and Bentham, I had removed *C. aculeatum* to *Eulophia* under the name of *E. plicata* (Linn. Soc. Journ. xix. p. 336). Bentham observes (Linn. Soc. Journ. xviii. p. 317), under the head of *Cymbidium*, "the two African species referred to it by Lindley have been shown by Harvey to belong to *Eulophia* [this refers to *C. tabulare*, Sw., and *C. aculeatum*, Sw.]; but the *C. Sandersonii*, Harv., from South Africa, and an allied species from tropical Africa appear to be true *Cymbidia*." The only reference of Harvey to this subject which I have been able to find, is in the 'Genera of S.-African Plants,' ed. 2, p. 360, where he says:—"The Cape species referred to this genus by authors belong to *Eulophia*," and then alludes to *C. Sandersonii*, of Natal, as a genuine species. Harvey gives no reason for his statement, and it is inconsistent, as I shall presently show, with the generic limitations given in the same work, where *Cymbidium* is described as having a "labellum without spur," and *Eulophia* with "labellum spurred or saccate at base." In the 'Genera Plantarum' the same distinction is adopted, only that *Eulophia* is somewhat extended to include a "labellum . . . . in gibbum saccum vel calcar productum." So far as regards other characters, habit, and general appearance, the two species *C. aculeatum*, Sw., and the present plant have at least as much claim to belong to *Cymbidium* as to *Eulophia*. They seem to form a connecting-link between the Cape species of both genera, although these genera have been placed by Bentham in distinct subtribes. On this point what Bentham says is instructive:—"The division of the Vandeæ into subtribes is . . . . difficult, and as yet very vague in its results. Habit, and even geographical distribution, has often to be more relied upon than any absolute character" (Linn. Soc. Journ. xviii. p. 316).

But I have now, from many fresh specimens, satisfied myself that neither *C. aculeatum*, Sw., nor this plant has any approach to even a gibbosity at the base of the labellum. This is, in both, attached to the projecting mentum of the column, and the rounding off of the almost right angle of attachment alone gives the slight appearance of gibbosity. When the labellum is detached, this is seen to be deceptive. I have therefore no doubt of the propriety of restoring *C. aculeatum*, Sw., and of placing the present plant under the same genus.

I have only found this species in one spot; and as it does not appear in the Kew or Cape Herbaria, it is probably very local.

CYMBIDIUM TABULARE, *Swartz in Kongl. Vetensk. Acad. Handl. Stockh.* 1800, p. 238 (descriptio emendata). C. rhizomate repente; caule erecto robusto; foliis lineari lanceolatis; floribus spicatis cernuis, spicis 3–10-floris; sepalis ovato-oblongis; petalis oblongis; labello trilobato, lobis lateralibus convolutis, medio lamello lineari aurantiaca, apice basique furcata, permeato.

Totum glabrum; pedale vel ultra. Rhizoma vaginis emarcidis vestitum, 0·6–0·8 cm. crassum, radicibus filiformibus. Caulis supra rhizoma parum incrassatus subflexuosus. Vaginæ 5–6 obovatæ acutæ subventricosæ amplexicaules canaliculatæ 3 cm. longæ. Folium unicum (interdum duo) e vagina infima ortum erectum rigidum basi angustatum acuminatum. Bracteæ lineari-lanceolatæ membranaceæ acutæ ovario æquilongæ vel superantes. Flores flavo-virescentes, labello pallide flavo. Sepala 2 cm. longa venosa. Petala parum breviora obtusa apiculata. Labellum 1·6 cm. longum. Columna semiteres dorso convexa basi incurva vix in mentum producta 1·2 cm. longa. Operculum subovideum obtusum. Pollinia elliptica subparallela in glandula oblonga diaphana medio affixa. (Descriptio ex exemplaribus sub numero 4844 a me distributis!)

This appears to be, or to have been, an exceedingly rare plant. Thunberg (Flor. Cap. ed. 1823, p. 27) says, after the description, "*Unicum tantum specimen hucusque repertum fuit.*" In his 'Travels' (Engl. trans., London [1794], 4 vols. 8vo, vol. i. p. 220), describing the ascent of Table Mountain in 1773, in the middle of January, he remarks, "Of the *Serapias tabularis* we found only one specimen." Lindley, in his 'Genera and Species of Orchidaceous Plants,' simply records the diagnostic characters without any remark. In his "Notes upon some Genera and Species of Cape Orchids" in the 'Companion to the Botanical Magazine,' 1836, ii. p. 201, he observes:—"*Satyrium tabulare, pedicellatum* and *giganteum* of Linnæus, of which the first grows on Table Mountain, and the others near Zekoe River, near Algoa Bay, have never been gathered by either Burchell, Ecklon, Drège, Villett, or any of those by whose investigations the Cape Flora has of late years been so much extended. It is very much to be wished that these three plants should be sought out by some resident botanist who has the leisure and means of looking after them. *Satyrium pedicellatum* exists in the Linnean Herbarium, but I have never even seen the others." To this it may be added that it is not mentioned in Sonder's, Reichenbach's, Krauss's, nor Harvey's writings on Cape plants; nor were there up to this date any specimens in the rich Cape collections at Kew*.

On Dec. 18, 1882, my friend Mr. A. A. Bodkin, M.A., brought me a plant which he had gathered in a favourite botanizing place of ours, in moist spongy ground, amongst Restiaceæ &c. in a shallow valley on the Muizenberg Mountain (Cape Peninsula) at about 1400 feet elevation above the sea, and about fourteen miles from Cape Town. Upon examination, and after careful dissection and drawing, I came to the conclusion that it was the *Cymbidium tabulare* of Swartz, with the description of which in Thunberg's 'Flor. Cap.' it agreed admirably in every particular. On Dec. 24 we went together to search for more, and, to our delight, found six or eight specimens in the same place. Two days later we found another specimen on the lower part of Table Mountain, in a valley above Klassenbosch, at about 2300 feet.

The plant has since been compared with Thunberg's type-specimen by Mr. N. E. Brown, of the Royal Herbarium, Kew, and its identity established beyond a doubt.

Respecting Harvey's removal of *C. tabulare* to *Eulophia*, quoted with approval by Bentham (Gen. Plant. iii. p. 537), it may be remarked that neither author appears to have seen the plant. Further, that in all generic characters it is identical with *C. Sandersonii*, Harv., which is admitted by Bentham as a genuine species.

BARTHOLINA.

BARTHOLINA ETHELÆ, *Bolus*, n. sp.; caule erecto, gracili, ½–1-pedali; folio unico orbiculato-cordato; scapo 1- vel raro 2-floro;

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* [There are two specimens in the Kew Herbarium collected "on the summit of the Craggy Peak, near Zwellendam, 15th Jan. 1815," Burchell 7358! which have been seen by Lindley and by Reichenbach fil. In Lindley's herbarium is a specimen collected by Harvey, labelled "*Cymbidium tabulare*, summit of Table Mountain, very rare, Jan. 1841;" and another with a coloured drawing communicated by Dr. Pappe, collected by Zeyher on mountains between Hottentot-Holland's Kloof and Palmeit River. On the sheet on which these are mounted is written in pencil the words "is really a *Cymbid.*;" and I believe the handwriting to be that of Prof. Reichenbach.—N. E. BROWN.]

sepalis lanceolatis glabris; petalis oblongo-falcatis obtusis; labello circumscriptione suborbiculari, lamina subconcava 3–4-loba laciniis linearibus apice clavatis alte partitis, basi calcarata.

Folium, scapus bracteaque pilosa. Tubera ovata vel subsphærica 1·5–2 cm. longa. Folium per anthesin marcescens 2–3 cm. latum. Scapus subrectus 6–12-uncialis. Bractea ovata obtusa apiculata ovario bis terve brevior. (In exemplari unico bifloro, flos inferior, pedicello elongato 3 cm. longo, e bractea communi oritur.) Sepala lineari-lanceolata, viridia, 1·2–1·4 cm. longa, erecta subparallela basi in processum semitubulatum connata. Petala in utroque latere antheræ erecta, basi, labello antheraque leviter connata, 1·6 cm. longa, violacea medio lineata. Labellum cum calcare 4·0–4·5 cm. longum, calcare acuto 0·11–1·1 cm. longo, laciniis sæpissime inflexis, apice dilatatis quasi in pulvillos albos desinentibus; lamina supra violacea subtus cum laciniis brunneo-purpurea. Columna ob formam insolitam vix recte columna dicenda, stigmate longule ab anthera dissito et ab ea viridi collo basin constituente, sejuncto. Anthera erecta inter petala et ab iis amplexa, 1·1 cm. longa; loculis parallelis distinctis tortis; connectivo diaphano; caudiculis subrigidis; glandulis basi vix protrusis, supra aditum angustum versus stigma ducentem positis. Stigma ovoideum madidum summo ovario insidens. Ovarium curvatum 2 cm. longum. (*v. v.*)

Hab. Sub fruticulis ad pedes collis aridi mare spectantis, sinu Kalk Bay, Peninsulæ Capensis, alt. 150 ped., flor. Dec. Legit E. Bolus; tum in monte Muizenberg, alt. 1200 ped. eodem mense cum *Cymbidium ustulatum*, Bolus, crescentem legi ipse. Herb. meo No. 4850!; 'Cape,' Rev. W. Rodgers and Sir F. Grey in Herb. Kew.!

The structure of this species, like that of *B. pectinata*, R. Br., is very curious, and can scarcely be explained without a figure. The drawing in the 'Bot. Register,' tab. 1653, is tolerably good, but not quite clear as to the position of the stigma and ovary. From *B. pectinata* the present species is readily distinguished by its obtuse petals, the longer spur, and the dilated ends of the segments of the labellum, and by its glabrous ovary and sepals. *B. Burmanniana*, Ker, from which Lindley separated *B. pectinata*, is unknown to me; I suspect they are mere forms of one species. I have named the above-described species after my daughter, who first detected the plants hidden under bushes, and who has helped me for many years in my botanical work.

SATYRIUM.

SATYRIUM SAXICOLUM, *Bolus*, n. sp. Humile 5–7 cm. longum; caulis debilis decumbens; folia sæpius 3 flaccida, infimum ovatum ellipticumve obtusum basi amplexicaule 3–7 nervatum patulum 3·50–6·0 cm. longum, superiora sensim minora acuta, supremum basi subcucullatum; spica 4–5 flora, 2·0–2·75 cm. longa, bracteis ovatis acuminatis reflexis flores superantibus; sepala lateralia ovato-oblonga subfalcata obtusa, intermedio oblongo obtuso, totis circa 0·5 cm. longis; petala lateralia oblonga paulo breviora; labellum galeatum subacutum sæpius cristatum dorso ciliatumque 0·8 cm. longum, saccis obtusissimis vix 0·15 cm. longis præditum; columna erecta apicem versus deflexa; rostellum patulum 3-lobum stigmati fere æquilongum; stigma oblongum longius quam latum, basi utrinque tuberculatum; ovarium suborbiculatum secus costas scabro-papillosum, circa 0·4 cm. longum. (*v. v.*)—S. bracteatum, *Thunb.*, var. latebracteatum, *Sond.*! *in Linnæa*, 1847, xix. p. 89.—S. lineatum, var. γ, *Lindley*! *Gen. et Sp. Orch.* p. 344 (non vars. α & β).

Hab. In rimis humidis saxorum præcipitium umbrosorum in montibus Peninsulæ Capensis, alt. 1000–2400 ped.; flor. Oct. *Drège* 1259 *b*!; *C. Wright* 136!; *Bolus* 3855!; et *Harvey* 117! *in Hb. Kew.*

The flowers are a brown-yellow striped with deep red lines, the leaves sap-green, paler beneath. In floral characters this closely approaches *S. lineatum*, Lindl. [=*S. bracteatum*, Thunb.! (non Lindley), N. E. BROWN], differing chiefly in the galea, shorter spurs, and longer stigma. But the habit is totally different, and the leaves very much larger. It is very exclusive in its habitat, whereas *S. lineatum* is found on open heathy mountain-sides and by streams; but I have never found it near the present plant, nor in similar places.

SATYRIUM LINDLEYANUM, *Bolus*, n. sp. Caulis erectus foliosus spithamæus; folia ovata subacuta adscendentia basi cordato-amplexicaulia, marginibus undato-reflexis, infimum 4–5 cm. longum, superiora sensim minora, in bracteis abeuntia; spica 5–10 cm. longa, 2·50 cm. lata, multiflora, bracteis acuminatis adscendentibus, floribus longioribus; sepala ovata obtusa, intermedium marginibus revolutis; petala lateralia trapeziformia obtusissima; labellum galeatum oblongum latius quam longum, apice cristatum ciliatumque, saccis subglobosis basi auctum, sepalis petalisque circa

0·3 cm. longis; columna erecta medio leviter deflexa; rostellum brevissimum depressum basi tuberculatum; stigma obovatum pulvinatum nec marginatum; ovarium latum costatum, 0·3 cm. longum. (*v. v.*)—S. bracteatum, *Lindl. in Gen. et Sp. Orch.* p. 342, *non Thunb.*

Hab. Juxta rivulos in collibus pone Simonstown, Peninsulæ Capensis, alt. circ. 800 ped.; flor. Oct. *H. Bolus* No. 4828!; *Burchell* 650! *Drège* 1251*d*!

The flowers are a yellowish white, the crest of the galea and the spurs tinted with a red-brown. It has the habit of *S. bicallosum*, Thunb.,* or at least of what I have taken to be that plant (no. 4554 of my distributions); but the galea is different, as well as the structure of the column, which is that most common to the genus; while in *S. bicallosum* it is very peculiar, and, so far as I have yet worked, quite unique in the genus.

SATYRIUM STRIATUM, *Thunb.*! *Fl. Cap.* p. 19. Glabrum erectum pusillum 4–6 unciale; folium inferum subrotundum subcarnosum basi amplexicaule solo adpressum, 1·6 cm. longum et latum, folium alterum ovatum acutum minus, tertium bracteiforme cucullatum; spica laxe 6–8 flora, 3–4 cm. longa; bracteæ rhomboideæ vel obovatæ cucullatæ subcarnosæ inferæ cuspidatæ, floribus fere æquilongæ et eos involventes 1·6 cm. latæ; sepala lateralia elliptica patento-recurva 0·4 cm. longa; sepalum intermedium late ovatum obtusum, marginibus deflexis; petala lateralia lanceolato-ovata subacuta 0·3 cm. longa; labellum oblongum fornicatum nec galeatum, nempe marginibus vix inflexis, emarginatum, obtusissime basi bisaccatum, saccis circ. 0·25 cm. longis; columna antice deflexa dorso pone stigma excavata, caudiculæ breves, glandulis magnis orbicularibus; rostellum antice triangulare, apice ultra glandulas longe protenso deflexoque; stigma oblongum marginatum; ovarium 0·5–0·6 cm. longum. (*v. v.*)

Hab. Vlaggeberg prope Stellenbosch; flor. Oct. a Domina de Waal (anno 1883) lectum, a Domina M. F. Farnham misum. Herb. propr. No. 6090!

Well distinguished from its congeners by its few and laxly flowered spike, its remarkably broad erect bracts, and its fornicate not galeate labellum. The stem is reddish, the leaves dull green above, reddish below, the flowers fulvous with red stripes, and a few glandular hairs at the base of the side sepals and petals. I have only seen three plants of it.

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* [This is the *S. bicallosum* of Lindley, but not of Thunberg.—N. E. BROWN.]

Satyrium Hallackii, *Bolus*, n. sp. Glabrum erectum robustum 10–15 unciale; caulis rectus foliosus; folia ovato-lanceolata acuta nervata basi amplexicaulia, infera 14–18 cm. longa, superiora sensim minora in bracteis abeuntia; spica oblonga densissime multiflora, 7–11 cm. longa, 4–5 cm. lata: bracteæ lanceolatæ juniores erectæ, demum reflexæ, floribus subæquilongæ; sepala lateralia oblonga subobtusa, sepalo intermedio lineare angustiore obtuso, omnibus 0·5–0·7 cm. longis; petala lateralia linearia obtusa sepalis æquilonga; labellum galeatum ore lato depresso, dorso carinatum, calcaribus apice attenuatis 1·2–1·6 cm. longis, ovario longioribus, præditum; columna stipite antice deflexo; rostellum 3-lobum sinubus magnis; stigma breve latius quam longum pulvinatum; ovarium costis tribus anterioribus prominulis, dorsali vix perspicua, 1 cm. longum. (*v. v.*)—Satyrium foliosum, et var. helonioides *Lindl.*! *Gen. et Sp. Orch.* p. 336, *non Swartz.*

Hab. In solo arenoso humido prope Shark's River, Port Elizabeth, legit R. Hallack, Dec. (1883), herb. propr. No. 6092!; Algoa Bay, *Burchell* 4372! Reef Cape, *Burchell* 4379!; prope Strandfontein et Matjesfontein, *Drège* 4772!

The large dense spike, the short wide stigma, and the very faint dorsal rib of the ovary seem to distinguish this species from its congeners. It is not uncommon, Mr. Hallack writes me, near Port Elizabeth. The flowers are a rosy pink.

Satyrium marginatum, *Bolus*, n. sp. Caulis erectus substrictus foliosus, pedalis vel ultra; folia ovato-lanceolata acuta basi amplexicaulia subcoriacea, leviter nervata, interdum marginata, 1 vel 2 inferiora abbreviata, caulina 6–11 cm. longa, 2·5–3·0 cm. lata, superiora ad bracteas reducta; spica multiflora 8–15 cm. longa, 1·2–2·5 cm. lata, bracteis oblongo-lanceolatis obtusis vel subacutis erectis floribus brevioribus; sepala lateralia oblonga obtusa 0·8 cm. longa, intermedio angustiore æquilongo apice incurvo; petala lateralia lineari-oblonga obtusa mucronulata, sepalis paulo breviora; labellum galeatum oblongum, limbo longissimo ore æquilongo acuminato apice reflexo, circa 0·8 cm. longum, calcaribus filiformibus 0·9 cm. longis ovario æquantibus præditum; columna erecta medio deflexa; rostellum antice trilobum basi tuberculis magnis utrinque donatum; stigma oblongum vel subquadratum vix emarginatum; ovarium circa 1 cm. longum,

dorso convexum absque costa dorsali. (*v. v.*)—S. parviflorum, *Lindl.*! *Gen. et Sp. Orch.* p. 336, *non Swartz.*

Hab. In pratis humidis, in campis "Cape Flats" dictis prope Cape Town; tum in jugis Hottentots-hollandbergen; flor. Oct. *Ecklon* 1561!; *Pappe* 65! 66!; *H. Bolus* 4550! 4551!; Worcester, *Cooper* 1613! 1684!

The flowers are nearly white, the lateral sepals tinged with pink, the rest of the flower with faint green lines. The whole plant dries a rusty brown. On Lindley's description in Gen. et Sp. Orch. p. 336, with which it agrees fairly well, this has been taken for *S. parviflorum*, Sw. But Mr. N. E. Brown informs me that it is not Swartz's plant. Then Lindley cited Jacquin's figure, Hort. Schonbr. t. 179, which adds to the confusion, for our plant is certainly quite different. The figure shows two large radical suborbicular leaves lying horizontally, reflexed bracts, and a different ovary; the galea alone is similar. The plant is not uncommon; and I have drawn it twice from different localities. It varies chiefly in the length of the leaves, which are sometimes much reduced, and in the width of the sepals and petals; but the erect and somewhat inflated bracts and the very large limb of the galea are constant marks.

DISA.

DISA OCELLATA, *Bolus*, n. sp. Glabra erecta, 6–9 uncialis; caulis foliosus flexuosus; folia 3–4, linearia acuta, 4–6 cm. longa, 0·5 cm. lata; bracteæ foliaceæ acuminatæ inferioribus floribus longioribus; spica laxe 8–13 flora, 7–10 cm. longa; sepala lateralia oblonga acuta interdum subfalcata, 0·85 cm. longa; galea oblonga acuta, ore subrotundo 0·9 cm. longa, calcare obtuso 0·3 cm. longo, aucta; petala lateralia oblonga apice falcata cuspidibus anterioribus, columnæ adnata; labellum lineare acutum 0·6 cm. longum; rostellum breve, brachiis nullis sed lateraliter processubus carnosis ciliatis præditum; anthera horizontalis, glandulis polliniorum arcte approximatis; ovarium 1 cm. longum. (*v. v.*)—Disa maculata, *Harv. in Hook. Lond. Journ. Bot.* 1842, i. p. 15, *non Linn. f.*

In graminosis montis Tabularis orientem versus, alt. circ. 3300 ped. die 4 Dec. 1882 legi. Herb. propr. No. 4849! *Harvey*!

The leaves are a dark green; the older flowers point upwards, the younger downwards; the sepals are a dull ochraceous yellow, and the galea has two large brown eye-like dorsal spots; the sepals and labellum project forwards. The rostellum, with its fleshy side-appendages, the absence of arms, and the consequent close approximation of the glands, shows a decided affinity with the section *Monadenia*, though the appearance of the plant as a whole is very different.

Disa uncinata, *Bolus,* n. sp. Glabra erecta vel leviter decumbens 25–33 cm. alta; tubera obovata 1 cm. longa; caulis interdum flexuosus distanter foliosus; folia radicalia 3–4, lineari-lanceolata acuta, basi amplexicaulia, laxe patentia, 5–10 cm. longa, caulina 2–3, conformia minora erecta; spica laxe 8–13 flora; bracteæ foliaceæ ovariis breviores; sepala lateralia oblonga concava acuta infra apicem dorso mucronulata, patentia, 0·7 cm. longa; galea horizontalis elliptica emarginata, ore circa 0·4 cm. lato, calcare 0·4 cm. longo, tubo constricto, apice inflato prædita, tota 1·2 cm. longa; petala lateralia falcata acuminata, basi dilatata dentata, 0·4 cm. longa; labellum lineare acutum 0·4 cm. longum; anthera horizontalis; stigma magnum pulvinatum marginatum; ovarium circa 1·2 cm. longum. (*v. v.*)

Hab. In solo argillaceo humido in montibus circa Mitchell's Pass et flumen Hex River, alt. 1200–1400 ped., flor. Oct., *H. Bolus,* herb. No. 5279! 6095!; Albany, *Cooper* 1878!; Baines' Kloof, *Cooper* 3598!

In the dried state this resembles *D. caulescens,* Lindl., but differs in galea, spur, and petals; the habit is similar. Small and laxly-flowered specimens might be confused with *D. ocellata,* Bolus; but, besides other differences, the leaves in the latter are much narrower and erect, and the galea is acuminate. The sepals are a dull white, passing at the back of the galea and the tips of the side sepals into a dull brown. The petals are pale yellow in front with brown points; labellum pale yellow. While most of our Orchids love a light almost sandy soil, this seems generally to prefer a stiff moist greyish clay.

Disa maculata, *Linn. f.*! *Suppl.* p. 407!* D. caule decumbente

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* [Mr. Bolus had described this plant as a new species; but as I have had the opportunity of comparing it with Thunberg's type specimen of *Disa maculata,* Linn. f., with which it is identical, and that plant being very imperfectly known, it appears desirable that Mr. Bolus's description from the living plant should be published, especially as Lindley has wrongly placed it in the genus *Schizodium.* The remarks following the above description were received from Mr. Bolus after he had been informed of the result of my comparison of his plant with Thunberg's type.—N. E. Brown, Herbarium, Kew.]

gracili unifloro (an semper?); foliis lineari-lanceolatis; vaginis scariosis rufo-maculatis caulem vestientibus; galea erecta subinfundibulari, apice acuta, basi obtusa vix saccata; sepalis lateralibus ovatis acuminatis; petalis linearibus resupinatis, apice erecto-inflexis dilatatis; labello lanceolato; rostello erecto bifido.

Semipedalis, tota glabra. Tubera obovata oblongave, 1 cm. longa. Folia 2–3, herbacea 5-7 cm. longa, 0·5 cm. lata, acuta, in petiolum angustata, læte viridia; vaginæ duo vel tres, bractea conformis. Flos pallide cæruleus leviter striatus. Galeæ os 1·5 cm. longum, 1 cm. latum. Sepala lateralia 1·7 cm. longa, 0·6 cm. lata. Labellum 1·4 cm. longum, 0·4 cm. latum. Petalis minimis sub galea absconditis, parte dilatata lutea brunneo striata. Columna carnea. Anthera resupinata. Ovarium tenue 1·5 cm. longum. Stigma suborbiculatum trilobatum atro-purpureum. (*v. v.*)—Schizodium maculatum, *Lindl.*! *Gen. et Sp. Orch.* p. 360.

Hab. In rimis saxorum montis Muizenberg, prope antrum magnum, alt. circa 1600 ped., flor. Nov. Herb. meo No. 4843!

This pretty little species is very distinct from any other. Yet why Lindley should have placed it under *Schizodium*, to which it has no possible resemblance, I cannot conceive. It seems to be rare in herbaria, and I have found no examples in Pappe's collections. Its discovery on the Cape peninsula is due to Mr. Bodkin; and I found it subsequently in some abundance in a deep ravine on the Muizenberg, in very similar stations (though at a lower zone of altitude) to that in which *D. longicornis*, Linn. f., is found.

§ VEXILLATA.

DISA VENOSA*, *Swartz.* D. caule erecto; foliis oblongo-obovatis; spica laxe pauciflora; sepalo altero erecto rhomboideo-oblongo saccato, lateralibus oblongis; petalis erectis oblongis; labello lanceolato; columna erecta subporrecta.

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* [Although there is no specimen named *Disa venosa* in Thunberg's herbarium yet the specimens on one of his sheets named *Disa excelsa* so well agree with his description of *D. venosa* (whilst they will not in any way agree with his description of *D. excelsa*, and are not at all like his other specimens so named), that they appear to me to be the identical specimens from which he made his description of *D. venosa*. The plant Lindley understood as *D. venosa* is very distinct from Thunberg's plant, and will not agree with his description. The plant in Thunberg's herbarium which I take to be *D. venosa* is identical with that here described by Mr. Bolus.—N. E. BROWN.]

Tota glabra, 1–1½-pedalis. Tuber ovoideum. Folia pleraque radicalia, acuta, herbacea, 4–5 cm. longa, 1 cm. lata, superiora minora, suprema ad vaginas cingentes reducta. Bracteæ ovatæ lanceolatæ. Flores carnei, petalis rubro-striatis. Sepalum alterum acutum marginibus pro parte reflexis, 2·2 cm. longum, 1·3 cm. latum, sacco circa 0·25 cm. alto; lateralia æquilonga, acuta recurvata, 0·9 cm. lata, pagina inferiore linea rubra notata. Petala apice oblique inflexa quasi fornicata, pagina interiore lineis rubris striata, 0·7 cm. longa. Labellum acutum 1 cm. longum. Columna erecta divaricata, membrana petaloidea postice sub antheram producta, eamque involvente, aucta. Anthera suberecta. Stigma suberectum violaceum. Ovarium 1·7 cm. longum. (*v. v.*)

Hab. In convalle montis Tabularis, supra Klassenbosch, alt. 2400 ped., flor. Decembri, legi. Herb. meo No. 4845 !*; in paludosis ad pedes montium French Hoek, alt. 1300 ped., flor. Nov. Herb. No. 5274 !; Table Mountain, *Pappe* 54 ! *Villet* !

This species is not common on the Cape peninsula, but it is widely distributed, and extends at least as far as Algoa Bay, whence I have had examples from Mr. Hallack differing only by being more robust, with larger and more pointed petals.

In the genus the following species—*D. secunda*, Sw., *D. filicornis*, Thunb., *D. patens*, Thunb., *D. reflexa*, Reichb. f. (though I do not think this can be separated from *D. filicornis*), with the present species, and perhaps some others unknown to me, constitute a very natural section. They are characterized by a dorsal sepal expanded (not galeate), saccate, or merely concave, and a suberect anther. They also possess a remarkable process of the rostellum of an expanded petaloid character, extending from the arms backward and under the anther, and reaching generally about halfway up its length. The form of the dorsal sepal, characteristic of this section, is much less common than the galeate; and as it somewhat resembles the vexillum of many Papilionaceæ, I propose to employ the term *Vexillata* for the section.

§ ORTHOCARPA.

DISA RICHARDIANA, *Lehm.*, *ex Lindl. Gen. et Sp. Orch.* 361. D. caule suberecto folioso; spica multiflora; foliis oblongo-lanceo-

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* The locality on Mr. Bolus's label sent to Kew as No. 4845 is "In depressis hieme inundatis in monte Tabulari supra Kirstenbosch."—N. E. BROWN.

latis; galea antica cucullata vix saccata; sepalis obovatis concavis; petalis oblongis apice oblique lobatis; labello oblongo truncato.

Herba glabra, 4–6-uncialis. Tubera ovoidea, 1·5 cm. longa. Folia infima 3 cm. longa, 1 cm. lata, superiora sensim minora, suprema in vaginas amplexicaules abeuntia, acuta, læte viridia. Bracteæ lanceolatæ acutæ. Spica corymboideo-congesta, 3–8-flora, 2–3 cm. longa. Galea ore contracta apice basique obtusa, 0·7 cm. longa, 0·5 cm. lata, candida. Sepala lateralia subæqualia obtusa concoloria, apice breviter roseo-suffusa. Petala reclinata, apice incurva lutea 0·55 cm. longa. Labellum incurvum aureum, 0·4 cm. longum. Rostellum reclinatum bifidum candidum. Anthera horizontalis. Ovarium 1–2 cm. longum. Stigma quadratum trilobum candidum (*v. v.*).—Penthea obtusa, *Lindl. Gen. et Sp. Orch.* 361.

Hab. In turfosis humidis, in clivo orientali montis Tubularis, alt. 3400 ped., a mense Septembri in Octobrem florens. Legit *H. Bolus* anno 1882, herb. No. 4846!, *Harvey* 121!

A very distinct species, recalling in habit dwarfed plants of *D. Melaleuca*, and also allied to *D. minor*, Reichenb. f. All these, with *D. atricapilla*, Bolus, *D. rosea*, Lindl., *D. fasciata*, Lindl., and perhaps some others, will constitute a very natural section of this difficult genus, distinguished by the following characters:—Spike generally crowded or opening slowly; flowers horizontal, usually appearing as a flat-topped corymb; galea anticous, fornicate or cucullate, neither spurred nor saccate. Lindley's name of *Penthea* for some of these is not suitable for the section, because several of his *Pentheæ*, as *P. reflexa*, *P. filicornis*, *P. patens*, by their large expanded posticous galea and different habit, belong to a distinct section. In the group I am now speaking of the galea is anticous because the ovary is straight, not twisted as is general in *Disa*; and, subject to a further examination of other species, I should suggest the term *Orthocarpa* for the section.

§ HERSCHELIA.

The following is a synoptical key to the published species of this section:—

Labellum crenate, waved, or entire.

Labellum oblong, reflexed; gland of pollinia longer than broad. 1. *D. graminifolia.*

Labellum ovate, incurved at the sides; gland of pollinia broader than long .... 2. *D. purpurascens.*

Labellum lacerate.

Spike 2–4-flowered; flowers nearly white. 3. *D. barbata.*

Spike 3–6-flowered; flowers blue, labellum white. 4. *D. venusta.*

Spike 10–15-flowered; flowers purplish, labellum green. 5. *D. lugens.*

DISA (§ HERSCHELIA) PURPURASCENS, *Bolus*, n. sp. D. labello ovato crenulato, marginibus inflexis; glandula polliniorum latiore quam longa.

Glabra erecta 1–1½ pedalis; tubera oblonga vel obovata; folia 6–8 omnia radicalia linearia graminoidea laxa 20–22 cm. longa, basi fibris foliorum delapsorum cincta; scapus flexuosus, vaginis membranaceis acutis; spica laxe 2-flora, bracteis late ovatis acutis membranaceis ovario multo brevioribus; sepala lateralia ovato-oblonga acuta patentia, 1·6 cm. longa; galea ore depresso subrotundo 1·5 cm. lato, subacuta, calcare conico adscendente 0·4 cm. longo prædita; petala lateralia medio linearia apice dilatata dentata basi oblonga subpatentia crenulata columnæ adnata 1·1 cm. longa; labellum 1·6 cm. longum; anthera deflexa, glandula oblonga; rostellum breve. (*v. v.*)

In convalle montis Muizenberg in Peninsula Capensi "Farmer Peck's Valley" dicta, juxta rivulum, alt. 1100 ped., duas plantas inveni, die 24 Nov. 1883. Herb. propr. No. 4893!

The colour of the flowers is a blue-purple, except the upper part of the petals and the spur, which are pale yellow; anther-cells pink.

This is very near *D. graminifolia*, Ker, but differs by its narrower and more acute side sepals, its more erect side petals; the shape of its labellum (which lies straight as to its length with its margins inflexed, like a shovel, while in *D. graminifolia* the margins are always straight, but as to its length it is reflexed), and finally by its shorter rostellum and gland. The flowering-season of the two species is separated by an interval of two months, an important circumstance as showing that the two plants are not complemental forms of the same species, which I should otherwise have thought probable.

DISA (§ HERSCHELIA) VENUSTA, *Bolus*, n. sp. Spica 3–6 flora; floribus cæruleis; labello lacerato albo.

Glabra erecta; tubera difformia; scapus simplex $1\frac{1}{2}$–$2\frac{1}{2}$ pedalis; folia 6–9 radicalia linearia graminoidea, medio marginibusque nervata, scapo breviora, basi fibris foliorum vetustiorum cincta; spica laxiflora leviter flexuosa, 7–10 cm. longa; sepala lateralia oblonga acuta infra apicem subtus mucronulata, 1·5 cm. longa, 0·6 cm. lata; sepalum posticum galeatum ovatum acutum, 1·3 cm. longum, 1 cm. latum, calcare ascendente compresso 0·5 cm. longo, præditum; petala lateralia linearia medio geniculata, apice dilatata dentata, basi oblonga obtusa integra, columnæ adnata, 0·8 cm. longa; labellum ovato-oblongum deflexum, laciniis obtusis incurvis barbatum, 0·9 cm. longum; anthera horizontalis; glandula polliniorum oblonga, longior quam lata; rostellum oblongum erectum; stigma sæpius obscure bilobum; ovarium gracile curvatum 1 cm. longum. (*v. v.*)

Hab. Inter Restiaceas fructiculosque in dunis Cape Flats dictis, prope urbem Cape Town, frequens; flor. Oct.–Nov. Herb. propr. No. 4566! *Harvey* 140!

The sepals are a cheerful blue to blue-purple, with darker veins; the petals white tinged with purple below; the labellum creamy white; the spur greenish yellow, producing, when looking into the flower, the appearance of a yellow eye; the anther-cells pink; stigma and rostellum white. In the dried state it resembles *D. barbata*, Sw., with which it has been confused in herbaria. But it is distinct by its more numerously flowered spike, blue flowers, and differently shaped galea and rostellum; and in the live state there is not a moment's hesitation in distinguishing them. It grows in the same localities as *D. barbata*, Sw., and *D. lugens*, Bolus, but flowers later than these, and about the same time as *D. purpurascens*, Bolus.

DISA (§ HERSCHELIA) LUGENS, *Bolus*, n. sp. Spica laxe 10–15 flora; floribus triste-purpureis; labello lacerato viride.

Glabra erecta $1\frac{1}{2}$–2 pedalis; tubera obovata 3–5 cm. longa; folia omnia radicalia 6–12 linearia graminoidea laxa, supra lævia, infra nervata marginataque, 20–40 cm. longa; vaginæ amplexicaules membranaceæ acutæ; spica 15–20 cm. longa; bracteæ ovatæ membranaceæ ovario breviores; sepala lateralia oblonga acuta 1 cm. longa; galea ore ovato acuta 1·1 cm. lata, calcare conico ascendente 0·3 cm. longo prædita; petala lateralia falcata acuminate biloba, basi dilatata et dentata; labellum oblongum margine lacerato-multifidum laciniis sæpe apicem versus 2–4 loba, 1·2–1·7 cm. longum, 1·0–1·3 cm. latum; rostellum breve suberectum 0·2 cm. longum; ovarium deflexum 1·7–2·5 cm. longum.

Hab. In arenosis prope Cape Town, flor. Nov., *H. Bolus* No. 3810!; prope rivulum "Kuil's Rivier," *Pappe* 39! 377!; *Ecklon* 1566!

The galea is a metallic greenish blue, the side sepals and petals dull purple, the lip green. This species is by far the strongest and tallest of this section, and is readily distinguished by its numerously flowered spike and green lip. The leaves are generally broader than in the allied species.

§ MONADENIA.

DISA TENUIS, *Lindl.*! *Gen. et Sp. Orch.* p. 354 (descr. emendata). D. foliis anguste linearibus; spica gracili densa multiflora; galea setaceo-acuminata, calcare brevi conico ascendente; sepalis oblongis dorso sub apice longe mucronatis; petalis oblongis; labello lineare; caudiculis polliniorum glandula unica affixis.

Tuber magnum oblongum; caulis gracilis erectus subflexuosus pedalis vel ultra, vaginis setaceo-acuminatis distanter vestitus; "folia 2–4, basi vaginula inclusa, subfiliformia, apicem versus latiora, linearia 1 lineam (0·2 cm.) lata" (ex *Sonder*); spica 6–10 cm. longa, 0·8 cm. lata, bracteis setaceo-acuminatis floribus æquantibus vel paulo brevioribus; sepala lateralia 0·25 cm. longa, mucrone 0·08 cm. longo aucta; galea suberecta 0·4 cm. longa, calcare vix 0·1 cm. longo; petala lateralia incurva margine antica serrulata 0·15 cm. longa; labellum subobtusum serrulatum petalis æquilongum; columna brevis; anthera resupinata, glandula polliniorum subquadrata; rostellum erectum; stigma depressum marginatum; ovarium clavatum 0·5 cm. longum. (*v. v.*) —D. leptostachys, *Sond.*! *in Linnæa*, xix. p. 98.

Hab. In clivis montis Diaboli prope "King's Blockhouse," Cape Town, alt. 1200 ped. flor. Maio, *Bodkin*, *Bolus* 4874!; in arenosis prope Wynberg, *Drège*!; in montibus ad flumen Palmiet Rivier, Junio, *Ecklon & Zeyher*!

The flowers are a dull green with purple spots on the galea, turning black in drying. The very acuminate galea and the single gland of the pollinia distinguish the species from any other. The latter character escaped Lindley. Sonder, in his excellent description of *D. leptostachys*, which I have no doubt is the same thing, says "Pollinia basi connata." By this character, and that of the stigma, which greatly resembles that of *Mona-*

denia micrantha, this plant forms a transition from the typical *Disæ* to *Monadenia.* I do not know whether the leaves appear at the same time with, or a little before, the flowers. Sonder and Lindley describe them; but I have never seen any thing more than some remains at the base of the stem. It is apparently a somewhat rare plant; for I have only had before me five examples in the Cape Government Herbarium, and these, gathered probably by Ecklon, came from precisely the same locality as the five or six specimens gathered by Mr. Bodkin in May 1883, and brought to me in a living state. The leaves would be very easily overlooked, especially if they were withered.

BRACHYCORYTHIS.

BRACHYCORYTHIS TYSONI, *Bolus*, n. sp.; foliis oblongo-lanceolatis; sepalis ovatis acuminatis; petalis cordato-ovatis; labello circumscriptione ovato, unguiculato, marginibus unguis inflexis, limbo expanso elliptico; columna elevata quasi stipitata.

Herba gracilis erecta glabra 1–1½-pedalis. Tubera ovoidea 1–1½ cm. longa. Caulis leviter flexuosus. Folia sæpius duo; inferius 10–12·5 cm. longum, 1·2–1·8 cm. latum, 3-nervium erectum; superius conforme paullulum minus; vaginis foliaceis 3–4, ovatis acuminatis. Spica laxe 6–10-flora. Bracteæ ovatæ acuminatæ, flores fere æquantes. Sepala inter se æquilonga, lateralia basi falcata, erecto-patentia, 3-lineata, 0·9 cm. longa, 0·2 cm. lata, virescentia. Petala erecta acuta, basi obliqua, 0·6 cm. longa, 0·2 cm. lata, albida. Labellum 1·0–1·2 cm. longum, limbo crenulato crispoque, 0·5–0·7 cm. lato; album, linea rubra medio striatum. Columna 0·4–0·5 cm. longa; anthera erecta; stigma lunatum carnosum. Ovarium gracile, argute costatum, 1·0–1·2 cm. longum. (*Ex exempl. plur. exsicc.*)

Hab. In uliginosis circa Kokstad, Griqualand Orientalis (Kaffraria), alt. 5000 ped., flor. Febr.; legit *W. Tyson* No. 1083! Katberg, *MacOwan* 1109! Eastern Frontier, *Hutton*! Kaffraria, *Mrs. Barber* 40!

The small town of Kokstad is situated not far from the south-west border of Natal, amongst the spurs of the great Drakensberg range, and about sixty miles from the sea. It lies some distance from the track of Drège, the only collector of any note who has ever traversed and explored that region. Hence we may expect many novelties from Mr. Tyson, who has very diligently commenced work there, and has already sent many Orchids and

other plants. Our species is very different from *B. ovata*, Lindl., and *B. pubescens*, Harv.; and, from description, must be more nearly allied to *B. tenuior*, Reichb. f.

PTERYGODIUM.

PTERYGODIUM RUBIGINOSUM, *Sond. ex Drège in Linnæa*, xx. p. 220. Erectum 9–11 unciale; caulis distanter foliosus, subflexuosus; folia lineari-lanceolata, pollicaria, infima caulem vaginantia, caulina semiamplexicaulia; spica multiflora, 8 cm. longa, 1·75–2·0 cm. lata, bracteis late ovatis acutis ovario æquilongis; sepala lateralia late ovata patentia concava acuta 0·7 cm. longa; sepalum posticum lanceolatum 0·6 cm. longum; petala lateralia subtriangularia vel cuneata integra nervata, margine superiori recta, margine libera anteriori leviter rotundata, 0·6 cm. longa; labellum semiorbiculare hastatum, margine vix undulata, multinervium, cum appendice carnosa erecta duplici biloba 1 cm. longum, 0·7 cm. latum; antheræ loculi valde incurvi fere orbiculares; ovarium rectum 0·9 cm. longum. (*v. s. s.*)

Hab. In humidis secus flumen Zondereinde Rivier pone Appelskraal ditione Caledon, alt. inter 500 et 1000 ped.; flor. Nov. *Zeyher* 3946! *Pappe* 34!.

I describe from two plants in the Cape Government Herbarium from the above collectors, as these are all I have ever seen. The tickets describe the colour of the flowers as brownish red, which they partially retain. The species has the habit of *P. venosum*, Lindl., but is slenderer, smaller, and quite distinct from that or any other species with which I am acquainted. I have not seen *P. magnum*, Reichb. f.; but, from the description, it must be very different.

[N.B. *P. rubiginosum*, in the dried state, resembles lax-flowering specimens of *P. carnosum*, Lindl., but is readily distinguished from that species by its triangular acute lip, which in *P. carnosum* is transversely oblong and emarginate.—N. E. BROWN.]

DISPERIS.

DISPERIS NAMAQUENSIS, *Bolus*, n. sp. D. caule erecto bifoliato; foliis cordato-orbiculatis vel ovatis; scapo unifloro; galea saccata acuta; sepalis lateralibus ellipticis patentibus medio obtuse alteque saccatis; petalis obovatis medio lobatis; labello ligulato supra medium in processum instar spathæ poculiformis expanso, dentibus duobus ex utroque margine quasi ansulis auctum.

Herba pusilla, 3–7-uncialis. Tubera elliptica 1 cm. longa. Folium inferum patens subacutum glabrum ciliolatum, 1·5–2·2 cm. longum, 1·1–2 cm. latum; superum minus cordato-ovatum acutum. Scapus gracilis aphyllus leviter pubescens. Bractea unica lineari-lanceolata amplexicaulis acuta 1–1·3 cm. longa, ovario brevior. Flores glabri sordide rosei. Galea 1 cm. longa, obtuse saccata, apice porrecta. Sepala lateralia æquilonga acuta. Petala 0·8–0·9 cm. longa acuta, galeæ adpressa, viridi-maculata. Labellum 0·8 cm. longum, limbo expanso 0·25–0·3 cm. lato. Rostellum erectum cuneato-oblongum, marginibus reflexis, brachiis tortis auctum viride. Anthera erecta pone rostellum et eo brevior. Polliniorum caudiculæ flexæ, granulis lineari-cuneatis. Ovarium cum basi angustata 1·4 cm. longum. (*v. v.*)

Prope Ookiep, Namaqualand Minor, legit Rev. W. J. R. Morris, mense Octobri 1878; tum in Kasteel Poort, prope Klipfontein in eadem ditione, alt. 3000 ped., mense Septembri 1883, legi ipse, inter lapides copiose crescentem, cum *Pterygodio Volucri*, Sw. &c., Herb. propr. No. 5820!

Orchids from a country where the average annual rainfall ranges from 1 to 4 inches, and where the landscape is frequently black from the remains of bushes killed by drought, are somewhat unexpected. Neither Drège nor Zeyher, who were both in Namaqualand during dry periods, have recorded any. The present species was first sent to me in 1878 by the Rev. Mr. Morris, to whom I am indebted for many good plants of that curious region; and I subsequently found it myself in September 1883, as above, in company with *Pterygodium Volucris*, Sw. Besides these, I found *Satyrium pustulatum*, Lindl. ?, on Spektakel Mount, and a *Holothrix* sp. ? near Ookiep, making four Orchideæ in all.

In *Disperis* the form of the labellum is very variable, but seems pretty constant in the species, and therefore affords good specific characters, though difficult of expression in few words.

CERATANDRA.

CERATANDRA BICOLOR, *Sonder, ex Drège in Linnæa*, xx. p. 220; caule erecto spithameo rigido subflexuoso; foliis præcipue radicalibus linearibus lineari-lanceolatisve involutis; spica laxe pauciflora; sepalo altero ovato cum petalis lateralibus obovatis in laminam leviter concavam nec galeatam connato; sepalis lateralibus ovatis; labello antico semiorbiculato obsolete trilobo crenulato lateribus inflexis, postice in appendicem bipartitam corniformem erectam producto.

Tota glabra, siccatione nigrescens. Tubera plura filiformia. Folia rigida 1·5–2 cm. longa, 0·2–0·3 cm. lata, caulinis basi amplexicaulibus, supernis auriculatis. Spica laxe 1–4-flora, sæpius biflora. Bractea sub quovis flore ovata acuta ovario brevior. Sepala ovata acuta 1·2 cm. longa, 0·8 cm. lata; altero parum minore, luteo-virescentia. Petala 1·3 cm. longa, 0·9 cm. lata, concava, marginibus crispis luteis. Labellum 1 cm. longum, appendice 0·8 cm. longa, luteum striis fuscis notatum, antice in medio caruncula conica elevata viridi præditum. Rostelli brachia patenti-incurva obtusissima. Antheræ loculi divaricati singulum pone brachium singulum rostelli situm et in eo involutum. Ovarium subteres tortum, costis obtusis, 1·5 cm. longum. (*v. v.*)—Ceratandra Harveyana, *Sond. in Linnæa*, xix. p. 108, *non Lindl.**

Hab. Inter Restiaceas in clivo orientali montis Tabularis supra Kirstenbosch, alt. 2300 ped., flor. Dec. Legit *H. Bolus* anno 1879. Herb. No. 4564! *Zeyher* 1574!

A very curious plant, which affords an excellent instance of the peculiarity exhibited by many Cape plants of springing up in considerable numbers during certain years, while in several succeeding years they fail to appear, and are apparently lying dormant, probably because the rainfall and requisite temperature have not coincided in a favourable manner. In the summer of 1879 I saw this plant, with the allied *C. Harveyana*, Lindl., growing abundantly where I gathered it. In the summers of 1880, 1881, 1882, 1883 I sought it in vain. It is distinguished from *C. Harveyana* by the smaller flowers and differently shaped labellum. The latter species seems to be rare. Lindley only knew it from a drawing and description by Harvey; the drawing, or a drawing, appears in Lindley's herbarium; but, by a singular error, Lindley himself affixed to the same sheet at a later date a quite different species collected by Pappe in Swartland, unknown to me, and, I believe, undescribed.

Since the above was written, I have seen specimens in the Cape Government Herbarium collected by Pappe, which are over a foot high and bearing 5–7 flowers.

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* [The synonymy of this plant is rendered certain from a label in Lindley's herbarium with a specimen of this plant communicated by Dr. Sonder, upon which is written, in Sonder's handwriting, "*Ceratandra bicolor*, Sond., *C. Harveyana*, Sond. in Orch. Eck. & Zeyhr., non Lindl. fide cl. Harv. in litt."—N. E. Brown.]

A Review of the Tuber-bearing Species of *Solanum*.

By J. G. Baker, F.R.S., F.L.S.

[Read January 17, 1884.]

(Plates XLI.–XLVI.)

The subjects of the differential characters, the relationship to one another, and the climatic and geographical individuality of the numerous types of tuber-bearing *Solanums* are of great interest both from a botanical and economic point of view. As there are many points which are still to be unravelled, I propose in the present paper to pass in review the material which we possess in England bearing upon the question. It was at the instigation of Earl Cathcart that I undertook the inquiry; and in carrying it out I have gone through all the dried specimens at Kew, the British Museum, and the Lindley herbarium, have carefully studied the wild types which we grow in the herbaceous ground at Kew, and have visited the extensive trial-grounds of Messrs. Sutton and Son at Reading, whose collection of cultivated types in a living state is probably the most complete in existence, and to whom I feel much indebted for their kind aid. I propose in the first place to deal with the species and varieties in detail geographically, then to summarize them from the point of view of the systematic botanist, and finally to make a few general remarks on the economic bearing of the facts.

1. CHILI.

1. **Solanum tuberosum**, *Linn.*—The following is a description, made from the living plant, of typical *S. tuberosum*, as grown in the herbaceous ground at Kew:—Rootstock bearing copious large tubers. Stems stout, erect, flexuose, much branched, 1–2 feet long, slightly hairy, distinctly winged on the angles. Leaves pseudo-stipulate, a fully developed one about half a foot long, with 7–9 finely pilose oblong acute large leaflets, the side ones stalked and unequally cordate at the base, the 1–2 lowest pairs much dwarfed, leaving a naked petiole about an inch long; the rhachis furnished with numerous small leaflets interspersed between those of full size. Flowers numerous, arranged in compound terminal cymes, with long peduncles; pedicels hairy, articulated about the middle. Calyx hairy, $\frac{1}{4}$–$\frac{1}{3}$ in. long; teeth deltoid-cuspidate, as long as, or a little longer than, the campa-

nulate tube. Corolla dark lilac, subrotate, nearly an inch in diameter, pilose externally; segments deltoid, half as long as the tube. Anthers bright orange-yellow, linear-oblong, nearly $\frac{1}{4}$ in. long; filaments very short. Berry perfectly globose, smooth, under an inch in diameter.—To this type the following wild Chilian specimens in the London herbaria evidently belong, viz.:—(1) Bridges, 719, "In los Andes near rivers, province of Valdivia;" (2) Reynolds, 78, "Antuco;" (3) Germain, "Cordillera de Maule;" (4) Gillies, "Andes of Chile and Mendoza;" and (5) Gillies, "At San Isidro, near the foot of the mountains of Mendoza, March 1824."

2. Solanum etuberosum, *Lindl.*—This is figured and described by Lindley in the 'Botanical Register,' tab. 1712, and is adopted as a species by Dunal. The specimen figured is now in the Lindley collection at Cambridge. Lindley's note upon it is as follows:—"Facies omnino *S. tuberosi*, sed tubera nulla profert: flores majores sunt, brevius pedunculati, calyxque glaber est et lucidus, nec pilis hispidus. Species certo certius distinctissima, etsi notis lævibus cognoscenda. This curious plant is a hardy perennial, native of Chili, whence it was obtained some years since by the Horticultural Society. It bears rich clusters of purple blossoms, with a golden yellow centre, from July to October, and is very easily multiplied by dividing its stout rooting underground stems. Although extremely similar to the Potato in appearance, yet its larger and more compact flowers, and its want of the power of producing tubers, render it a proper plant for a flower-garden." To me it seems likely to be a variety of *tuberosum*, marked by its want of tubers, its subglabrous leaves and calyx, its short unpointed calyx-segments, and very large bright-coloured corolla. A wild specimen, called *S. etuberosum*, in the Chilian herbarium of Mr. E. C. Reed, labelled (by Dr. Philippi?) "Los Damos, Jan. 1872," differs from Lindley's type by its more hairy leaves and calyx and more pointed calyx-teeth.

3. Solanum Fernandezianum, *Philippi.*—This is a plant of the island of Juan Fernandez, characterized in the 'Linnæa,' vol. xxix. p. 23. It looks to me likely to be a mere variety of *S. tuberosum*, differing from the type by its slender stems, subglabrous stem, leaves, and calyx, very large thin narrow-oblong pointed leaflets, small calyx, and small purple corolla. The

specimens I have seen are—(1) Ex herb. E. C. Reed; (2) gathered by Prof. Moseley, on the 'Challenger' Expedition, Nov. 1875, in flower; and (3) Bertero, labelled "Forte spontaneum; vulgo, 'papa silvestre'; tubercula gustu amara; in sylvis umbrosis montium editorum ins. Juan Fernandez, April. 1830," leaves only.

4. Solanum Maglia, *Schlecht.*—This is mentioned vaguely by Molina, but was first clearly characterized by Schlechtendahl in his 'Hortus Halensis,' p. 6. We have grown it now for upwards of twenty years at Kew side by side with *S. tuberosum*, and it has maintained its individuality. The following are my notes upon it made this summer from the living plant in the Kew herbaceous ground:—Rootstock bearing copious large tubers. Stems stout, erect, flexuose, much branched, 1–2 feet long, slightly hairy, strongly winged on the angles. Leaves pseudo-stipulate, 6–9 in. long, including the $1\frac{1}{2}$–2 in. petiole; large leaflets 5–7, ovate, acute, thinly pilose, 2–3 in. long, the side ones stalked and unequally cordate at the base; lowest pair of leaflets much dwarfed; interspersed small ones few or none. Flowers in copious compound long-peduncled cymes; pedicels downy, under an inch long, articulated about the middle. Calyx $\frac{1}{4}$–$\frac{1}{3}$ in. long, hispid; teeth deltoid-cuspidate, longer than the tube. Corolla white, subrotate, $\frac{3}{4}$–1 in. diam.; segments deltoid, $\frac{1}{4}$ in. long and broad. Anthers $\frac{1}{4}$ in. long, bright yellow; filament very short. Style clavate, twice as long as the stamens. Fruit not seen.—Schlechtendahl sums up its geographical range in Chili as follows:—"Crescit maxima copia in littoris maris clivis argillosis saxosis rupibusque (arenosa et fertilia loca spernens) inter 15–400 ped. altitudinem, nunquam longius terram intrans quam 1–2 leguas, a portu Valparaiso regni Chilensis boream et austrum versus." The wild specimens I have seen are as follows, viz.:—(1) Matthews, 311, "Seaside, Valparaiso, Sept. 1830;" (2) Bridges, 401, "Valparaiso, near the coast;" (3) Harvey, "Common near Valparaiso, April–July, 1856;" (4) Cuming, 555; (5) Macrae, "Valparaiso, Feb. 1825," in the Lindley herbarium. According to a note in the herbarium by Sir J. D. Hooker, the Kew specimens were raised from small tubers given to the Garden by Dr. Sclater in 1862, and the plant bore no tubers in 1863 or 1864, when grown in the arid sandy soil of the nursery pleasure-ground. There were specimens in Gay's herbarium, dried, from the grounds of M. Vilmorin, in Oct. 1865, with the following note:—"Croit

spontanément à Valparaiso, d'où M. Blanchard, consul de France, en ce lieu a rapporté des tubercules à M. Vilmorin, son parent, qui les cultive depuis l'année 1854. Les tubercules, peu nombreux, sont très petites et d'une saveur acre; ceux que j'ai vu en Novembre étaient de forme ellipsoide et longs d'un pouce et demi à $2\frac{1}{2}$."

From all that we know it would appear therefore that in Chili *S. tuberosum* is a plant of the hills of the interior, *S. Maglia* of the near neighbourhood of the coast. This is still further confirmed by the fact that the wild potato found by Darwin in the Chonos Archipelago, in south latitude 44°–45°, is undoubtedly conspecific with the *S. Maglia* of Valparaiso. Original specimens from Darwin are in the Kew herbarium, and they are quite characteristic of *S. Maglia*, differing only from the plant grown in Kew Gardens just described by their larger (white) corolla and more densely hispid calyx, with more acute teeth. Darwin's note on the plant, as printed at page 288 of the 1835 octavo edition of the 'Voyage of the Beagle,' is as follows:—"Chonos Archipelago.—The wild potato grows on the islands in great abundance on the sandy shelly soil near the sea-beach. The tallest plant was 4 feet in height. The tubers were generally small; but I found one of an oval shape 2 inches in diameter. They resembled in every respect and had the same smell as English potatoes; but when boiled they shrunk much and were watery and insipid, without any bitter taste. They are undoubtedly here indigenous. They grow as far south, according to Mr. Low, as latitude 50°, and are called Aquinas by the wild Indians of that part. The Chilotan Indians have a different name for them. Professor Henslow, who has examined the wild specimens which I brought home, says they are the same with those described by Mr. Sabine from Valparaiso; but they form a variety which by some botanists has been considered as specifically distinct. It is remarkable that the same plant should be found on the sterile mountains of Central Chili, where a drop of rain does not fall for more than six months, and within the damp forests of these southern islands." The true explanation of what Darwin in the last sentence, with characteristic sagacity, commented upon as very remarkable, is evidently that the Chonos plant and that of the Chilian Cordilleras are each distinct species.

The plant dealt with by Sabine in his well-known paper "On the Native Country of the Wild Potato," in the 5th volume of the 'Transactions of the Horticultural Society,' is also undoubted *Solanum Maglia*, as just described. The history of the plant is as follows:—Two tubers were sent to the Society from Chili in 1822 by Mr. Alexander Caldcleugh, Secretary to the Legation at Rio Janeiro. They were planted in the garden at Chiswick in richly-manured soil, and the produce was most abundant. The two plants in a single season yielded about six hundred tubers. These were of various sizes, a few as large or larger than a pigeon's egg, others as small as the original wild ones, which were globose and under an inch in diameter. The flavour of them when boiled was exactly that of a young cultivated potato. Sabine gives two excellent figures, a coloured one of the stem, leaves, and flowers, life-size, on plate 11, and on plate 9 figures of two tubers before and after cultivation. Although these figures are cited by Dunal in his Monograph in DeCandolle's 'Prodromus' under *S. tuberosum*, there cannot be any doubt that they represent excellently the present type.

5. SOLANUM COLLINUM, *Dunal in DC. Prod.* vol. xiii. p. 36.—This is fully characterized by Dunal from Bertero's No. 1328, a plant labelled by the collector "Papa cimarrona, incolis," and gathered "In fruticetis collium locis incultis Quillota, regni Chilensis." I have not seen an authentic specimen; but cannot by the description distinguish it from *S. Commersoni*, to be noticed directly.

2. BRAZIL, URUGUAY, AND ARGENTINE REPUBLIC.

1. SOLANUM COMMERSONI, *Dunal.*—This is fully described by Dunal in DeCandolle's 'Prodromus,' vol. xiii. p. 35, and by Sendtner in 'Flora Brasiliensis,' vol. x. p. 12. It is noticed by Sabine in his paper on the Native Country of the Wild Potato, and is well figured by him from Commerson's original specimens on plate 10 of the 5th volume of the 'Transactions of the Horticultural Society.' I have not seen it alive, and the following description is drawn up from herbarium specimens. Stems dwarfer and more slender than in ordinary *S. tuberosum*, the rootstock bearing copious large tubers. Leaves sometimes, but not always, pseudo-stipulate, 5–6 inches long when fully developed, with a naked petiole 1–1½ in. long; 5–9 oblong acute or often obtuse thin leaflets, the terminal ones much the longest, the lowest pair much dwarfed; the rhachis entirely without any

small leaflets interspersed amongst the large ones. Flowers in lax compound terminal cymes, just as in *S. tuberosum* and *S. Maglia*; pedicels long or short, articulated about the middle. Calyx $\frac{1}{6}$–$\frac{1}{4}$ in. long; teeth deltoid or lanceolate-deltoid, as long as the tube. Corolla $\frac{1}{3}$–$\frac{1}{2}$ in. long, pale lilac or white, the lanceolate-deltoid segments quite as long as the tube. Anthers orange-yellow, longer than the corolla-tube. Style always distinctly exserted beyond the anthers. Berry not seen.

The specimens I have seen which belong to *S. Commersoni* are the following, viz.:—(1) Gibert, 110, "Montevideo;" (2) Gibert, 906, "in silvaticis ad ripas Santa Lucia, Uruguay, Mch. 1869;" (3) Gibert, 42, "Parana, May 1856. Vulgo Batatilla. Croit dans les lieux humides. Le tubercule a absolument le goût de la pomme de terre ordinaire;" (4) Gibert, 54, "Montevideo, Mars 1858;" (5) Tweedie, received in 1837, "This variety of the Pampas is finely scented;" (6) Balansa, 2103 of his Paraguay distribution: "Spontané? Rhizome produisant des tubercules gros comme des noix. Fleurs blanches, L'Assomption, sur les bords humides des chemins, juin 1875;" (7) Lorentz, 966 of his "Flora Entreriana, Concepcion del Uruguay, $\frac{2}{5}$ 1877" (Grisebach's note on the plant in 'Symbolæ Argentinæ,' p. 24, is "Tubera purgantia: corolla alba: Entrerios, ubique in campis post pluvios"); (8) Gibert, 962, "Montevideo, inter rupes maritimas, Maio 1868;" (9) Montevideo, Coll. M. Isabelle, from herb. Gay; (10) Gillies, "hedges, Buenos Ayres, May 1820;" (11) Capt. King, "Montevideo;" (12) Gibert, 263, "Bords du Rio Negro, près des Mercedes, sables, très commune, avril 1867;" and (13) Four specimens from the Berlin herbarium gathered by Sello, with a printed label "Brasil" (many of the plants distributed with this label were really gathered at Montevideo).

Solanum Ohrondii, *Carrière*, which is fully described and figured in the 'Revue Horticole,' 1883, pp. 496–500, figs. 99–100, is clearly identical with *S. Commersoni*. Tubers of it were lately brought by M. Ohrond, a surgeon in the French navy, from the island of Goritti, at the mouth of the Rio de la Plata, and grown at Brest by M. Blanchard, gardener-in-chief of the Marine Hospital, who gives his experience of it as follows:—

"From the time of its importation I have cultivated the plant, or rather left it to itself to grow, for it is almost impossible to destroy it when once it has become established in a piece of ground. Each year, at the end of June or the beginning of July, I have collected the tubers; but the rootstock creeps so widely that always plenty have remained in the ground to furnish stock for another year. It is my belief that it would be easy to improve the tubers by simply cultivating them. Already the cultivated tubers are much better than those which I received from M. Ohrond. The wild tubers were scarcely bigger than small walnuts; but some of those of the cultivated plants have attained the size of small hen's eggs. I may add that the tubers are quite palatable, with a taste of chestnuts, but leaving in the mouth a slight flavour of acidity, like that of a potato that has sprouted. My workmen and I have tried them both boiled and baked in the oven; the latter are preferable. As to the hardiness of the plant it is complete, at least here at Brest. During the winter of 1881, when the thermometer fell two degrees Centigrade below freezing-point, the tubers took no harm, and up to the present time the plant has not been found to suffer in the least from disease."

Besides *S. Commersoni* there are two well-marked distinct species in Brazil with pinnate leaves—*S. reptans* of Bunbury and *S. tenue* of Sendtner. These are fully described by Dunal and Sendtner; but, so far as is at present known, they do not produce tubers. Besides these I have seen the following from the present geographical area:—

Solanum Maglia, "Buenos Ayres, Tweedie;" "Hort.: brought from Buenos Ayres;" and another, "Hort. Glasgow, from wild root."

Five specimens of a plant from Tweedie—two labelled "Uruguay;" two "This has a considerable quantity of a nasty soft watery potato at its root, called Papas amarga, in consequence of its bitter taste;" and one, "Papa amarga of Buenos Ayres. Roots large, but poisonous." This has the corolla of *S. Maglia* and *S. tuberosum*, associated with leaves with as many as 9–11 leaflets, with only a casual interspersed leaflet or none at all. This is most likely a marked variety of *S. tuberosum*, and is well worthy of further attention.

3. PERU, BOLIVIA, ECUADOR, AND COLOMBIA.

1. SOLANUM TUBEROSUM.—In their 'Flora Peruviana,' vol. ii. p. 38, Ruiz and Pavon say of *S. tuberosum*, "Habitat in Peruviæ

et Chilensis regni cultis et in collibus Chancay ad Jequam et Pasamayo prædia;" and in a letter to Lambert, cited by Mr. Cruikshanks in Hooker's 'Botanical Miscellany,' vol. ii. p. 203, Pavon writes:—"The *Solanum tuberosum* grows wild in the environs of Lima, and fourteen leagues from Lima on the coast." There are two sheets of fine specimens gathered by Pavon in the herbarium of the British Museum, labelled "Patatas del Peru," on which I took the following notes:—Stem stout, elongated, flexuose, slightly pilose. Leaves pseudo-stipulate, 6–8 in. long, including the 1–1½ in. petiole; leaflets broad ovate, cordate at the base, acute, thin in texture, green and thinly pilose above, grey and densely pilose beneath; main ones 9–11, the end one 2½–3 in. long, 18–21 lines broad; lowest pair very small; interspersed small leaflets many. Flowers in a dense long-peduncled compound cyme; pedicels articulated at the middle. Calyx ¼ in. long, densely pilose; segments lanceolate-deltoid, twice as long as the tube. Corolla white, under an inch in diameter; teeth deltoid, half as long as the tube. Anthers ⅙ in. long. Style much exserted. This, I should say, differs from the typical Chilian *S. tuberosum* about as much as one of the garden forms of potato differs from another. The following dried specimens, which I have seen, from different parts of the Andes all seem to me mere forms of *S. tuberosum*:—(1) A series of eight different plants from Peru, gathered by Maclean, labelled "Mottled," "Yellow (Amarilla)," "White (Blanca)" (these three I presume to be cultivated plants), "Guayruma," "Chorillos," "San Mateo," "wild, white-flowered, Huamantanga, 11,000 feet," and "wild, blue-flowered, Huamantanga, 11,000 feet." (2) A dwarf slender subglabrous form, with ovoid fruit and small lilac flowers, in Spruce's collection from the Andes of Quito, No. 6123, "In monte Carguairago, alt. 12,000 pedes. This is one of the Sacha-papas, or wild potatoes. Both tubers and berries are edible; the former reach the size of a pigeon's egg." (3) Mandon, 397, "Andes of Bolivia, Prov. Larecaja: viciniis Sorata, in scopulosis montis Illampu, Lancha de Cochepata. Regio subalpina, 3500 metres, Nov. 1878." (4) Matthews, 847, "Peru, amongst rocks, Lomas of Amancaes, July." (5) Matthews, 772, "Peru, Cuesta de Purruchuca, April:" a subglabrous form, with very large terminal and numerous very small side-leaflets, large white flowers, and a very long style." (6) Matthews, 771, "Peru, Cuesta de Purruchuca, April:" a glabrous sarmentose form, with small long-petioled acute leaflets very cordate at the base, very numerous large white flowers, and a long style. (7) Jameson, "Valley of Lloa, Ecuador, at 8000 feet, in places where the forest has been cleared with the object of cultivating the soil." (8) Lobb, Colombia, very dwarf, with very hairy stems. And (9) Fendler, 271, Venezuela, near Tovar.

In his recent botanical expedition to the Andes, M. Edouard André paid special attention to the question of wild Potatoes, and the following is what he says on the subject in the 'Illustration Horticole' in 1877, vol. xxiv. p. 114:—

"I have found *S. tuberosum*, authentic and spontaneous, far from any human habitation, in three different places.

"The first was the summit of Quindio, in Colombia, near the volcano of Tolima, at 3500 metres above the sea, in 4° 34′ N. lat. The plant formed small tufts in the vegetable mould of the forest, amongst the stunted trees of this alpine region. Its long branches were half subterranean and branched, and at their extremity the tubers were of the dimensions of a small elongated nut, feculent and slightly bitter. The flowers were white, with a lilac tinge, smaller than in our cultivated varieties; but this I attribute to the poverty of the plant in such a rigorous climate, only 1000 metres below the perpetual snows of Tolima.

"The second time was at Cauca, in the "boqueronnes" or copses of the neighbourhood of the town of La Union, in 1° 33′ N. lat. The altitude this time was very different, not above 1900 metres. The plant was developed in all its beauty, amongst brushwood composed of *Siphocampylus*, *Sciadocalyx*, *Ageratum*, *Alonsoa*, *Rubus*, and *Lamourouxia*, with a flourishing vegetation and covered with flowers. This was in May 1876. The stems rested on the neighbouring bushes; their foliage was vigorous, and superb umbels of large violet flowers accompanied them.

"In the neighbourhood of the villages of this region the cultivated plant does not at all present this aspect, but forms short branched tufts, as in the fields of Europe. For the rest, the wild tufts were numerous, scattered, far from any road from which they might have been sown by accident, and they had completely the appearance of growing in a state of nature.

"The third time was not far from Lima, in the mountain of Amancaes, where grows the *Ismene*, and where, amongst the very poor herbage, the potato grows in abundance. It was spread not less plentifully in the island of San Lorenzo, near Callao. In these two localities it may perhaps have been brought by the hand of man; but it does not seem likely."

Since I began this paper M. André has kindly sent me for examination the beautiful series of dried specimens which he brought home.

The Quindio plant is evidently identical with *S. Otites*, Dunal in DC. Prodr. xiii. 1639. This is marked by its slender sarmentose glabrous stems, petiole longer than in *tuberosum*, nine thin oblong acute subglabrous leaflets ½–2 in. long, with sometimes but not always two small ones below the nine, but none interspersed amongst the large ones, a subglabrous calyx with deltoid segments much shorter than the tube, a small whitish corolla with deltoid lobes, and by its ovoid pointed fruit. The tubers, which were previously unknown, are described by M. André as being grey, oblong, 2–4 centimetres long, 1–1½ cent. broad, with a bitter taste. If not a distinct species, it must be considered a well-marked variety of *S. tuberosum*.

The plant from La Union is evidently a distinct species. It appears to be about midway between *S. tuberosum* and *S. ternatum* of Ruiz and Pavon. M. André did not find any tubers; but thinks it quite possible that they may exist. As I cannot identify it with any species already known, I have ventured to characterize it as a novelty, excluding it for the present from the category of tuber-bearing types.

SOLANUM ANDREANUM, n. sp.: herbaceum, subglabrum, tuberibus nullis vel ignotis, caule flexuoso, foliis atroviridibus pseudostipulatis, petiolo producto, foliolis magnis oblongis acutis 3–5 basalibus parvis 1–2, accessoriis interjectis nullis, cymis laxis multifloris pedunculatis, pedicellis subglabris supra medium articulatis, calycis subglabri segmentis deltoideis, corollæ violaceæ segmentis deltoideis, fructu ignoto.

Petiole above an inch long when the small basal leaflets are present; above 2 in. when they are absent. End-leaflets 2½–3 in. long, much narrowed at the base. Corolla an inch in diameter. Anthers ⅙ in. long, with very short filaments. Style only protruded a little beyond the anthers in the flower.

The Lima plant is a form of *S. tuberosum*, as here understood, to which also must be referred specimens gathered by M. André at Pasca, in New Granada, at an altitude of 2500 metres above sea-level. His collection also includes fine specimens of *S. ochracanthum*, H. B. K., and *S. caripense*, H. B. K., which have compound pinnate leaves, but are not tuber-bearing.

2. SOLANUM IMMITE, *Dunal.*—This is fully characterized by Dunal in vol. xiii. of the ‘Prodromus,’ p. 32, from a dried specimen in the herbarium of M. Boissier, gathered in Peru by Pavon. It is said to differ from *S. tuberosum* by its more slender stems, narrower leaf-segments, almost glabrous above and thinly hairy beneath, and by its almost glabrous calyx. We have a plant at Kew which nearly matches the description, “Matthews, 1965, Casapi, Peru.” I do not think that it is more than a slight variety of *S. tuberosum.*

3. SOLANUM COLOMBIANUM, *Dunal.*—This is fully described by Dunal in vol. xv. of the ‘Prodromus,’ p. 33, and I have examined an excellent type-specimen at the British Museum, on which I made the following notes:—Stems slender, glabrous, sarmentose. Leaves pseudo-stipulate, 4–6 in. long, with a 1–1½ in. petiole; leaflets oblong-lanceolate, nearly glabrous, very acute; main ones about 9, with numerous small ones interspersed; end one 1½ in. long, ⅓–½ in. broad. Flowers in a long-peduncled compound cyme; peduncle and pedicels nearly glabrous. Calyx glabrous, ⅙ in. long; teeth deltoid, scarcely exceeding the tube. Corolla small, lilac, with deltoid segments. This is Moritz 829, from the colony of Tovar, in Venezuela. It is labelled “Col. Tovar; silv. mont. sponte.; fl. Mart. *S. tuberoso* simillimum et tuberis æqualibus instructum, sapore paullo acriori.” I do not think that it is more than a slight variety of *S. tuberosum.*

4. SOLANUM VALENZUELÆ, *Palacio.*—All that is known of this is contained in a letter from M. Palacio to M. DeCandolle, dated London, February 1816, which is printed at p. 340, vol. ii. of the Memoirs of the Paris Museum. It says:—“Dom. Eloy Valenzuela, Cure of Bucamara, in the department of Giron, in the province of Pampeluna, in New Granada, a pupil of Mutis, found in 1809 a new species of potato on the borders of the Maláve, at a height where the thermometer is 5° an hour before sunrise. He has named it *Solanum Papa*; but as the name Papa is common to all the potatoes, probably it would be well to call it *S. Valenzuelæ*. Its root is easy to cook, white, of very good

taste, and as useful as that of the old kind." Then follows a description, which quite fits for *S. tuberosum* except that the berry is stated to be oblong, compressed, and two or three inches in length. No specimens appear to have been sent to Europe, and the plant has not since been heard of. It may perhaps be identical with *S. Otites*, Dunal.

Solanum Maglia.—A plant in the Kew herbarium from Mr. W. Nation, received in 1863, labelled "Sandy hills of Lima, common," I cannot distinguish from the Chilian *S. Maglia.*

The following note, which accompanies a bottle of Chunos or dried Peruvian potatoes in the Kew Museum, may also be worth placing on record:—

"Extract of a letter from Mr. W. Atherton, Liverpool, dated Sept. 17, 1850, to the Secretary of the Royal Institution.—The natives of the interior of Peru prefer the Chuno to the potato in any other form. It is universally used in the departments of Cuzco, Lampa, Pimo, Chuquito, La Paz, Potosi, and elsewhere. The manner of preparation, which mostly takes place at a great elevation above the level of the sea, is to expose the potatoes, throwing water on them. They become frozen during the night, and the operation is repeated three successive evenings. They are then dried in the sun, the rarefaction and dryness of the air favouring this most effectually. Thus they are ready for use or keeping."

4. MEXICO.

1. Solanum verrucosum, *Schlecht.*—This is fully characterized and figured by Schlechtendahl in 'Hortus Halensis.' The native locality is stated to be "In regione Mineral de Monte Mexici satis frequens, ad vias, in sylvis, muris, etc., a Julio ad Oct. florens. C. Ehrenberg." M. Alphonse DeCandolle has recorded in the 'Revue Horticole' and elsewhere how it was cultivated for many years by peasants in the neighbourhood of Geneva, and how the cultivation was finally abandoned on account of the smallness of the tubers, and because they did not, as was hoped, resist the disease. The tubers, he states (Geog. Bot vol. ii. p. 815), are smaller and later in their development than in ordinary *S. tuberosum*, of excellent taste, with yellow flesh. The petiole is longer and the leaflets are fewer than in typical *tuberosum*, ovate, acute, densely hairy beneath, and the interspersed small leaflets are not invariably present. The flowers are large

and deeply coloured, and the berry is globose and dotted all over with white raised points. A specimen from Chiswick Gardens in 1847, from tubers sent by Mr. C. A. Uhde, is in the Lindley herbarium. I do not think it is more than a mere variety of *S. tuberosum.*

2. Solanum suaveolens, *Kunth & Bouché.*—This I know only from the full description in the 'Prodromus,' and a specimen dried from Kew Gardens in July 1874. The root is said to be fibrous, annual, and quite devoid of tubers. In the specimen in question the stem and leaves are nearly glabrous, the leaves conspicuously pseudo-stipulate, 6 or 8 inches long, with 9–11 large acute oblong-lanceolate leaflets 2–3 inches long, without any small ones interspersed. The flowers are small, white, and sweet-scented, the shape of the corolla being precisely that of *S. tuberosum.* The berry is said to be ovoid-globose, the size of a cherry, green, and variegated with irregular paler longitudinal zones.

3. Solanum stoloniferum, *Schlecht.*—This is said to be a native of the foot of the well-known volcanic mountain of Orizaba, at an elevation of 10,000 to 11,000 feet, and to be called by the natives "Papa cimarrona." It is said to have an annual stoloniferous tuber-bearing rootstock, with long running stolons and tubers the size of a hazel-nut. The following are my notes on authentic specimens from the Leipsic garden, dried in Aug. 1840:—Stems erect, slender, flexuose. Leaves pseudo-stipulate, 5–6 in. long, with a 1–1¼ in. petiole. Leaflets about 9, the lowest pair small, with several small ones interspersed on the rhachis, broad ovate, acute, much rounded at the base, the side ones distinctly petioled, the end one an inch long; the upper surface green and thinly hairy, the lower grey and densely hairy. Calyx ⅙ in. long, densely bristly; teeth lanceolate-deltoid, about as long as the tube. Corolla small, white, with deltoid segments. Anthers ⅙ in. long. Style much exserted. Berry subglobose.

4. Solanum demissum, *Lindl.*—This is fully described and figured by Lindley, in vol. iii. of the 'Journal of the Horticultural Society,' pp. 68 & 69, and I have examined the type specimen in the Lindley herbarium at Cambridge. The plant was received from Mr. C. A. Uhde, marked "Native Mexican Potatoes, growing at 8000 to 9000 feet elevation," and was cultivated at

Chiswick in 1847. I cannot see that it is more than a slight variety of *S. tuberosum*, closely allied to *S. verrucosum*.

5. SOLANUM UTILE, *Klotzsch.*—This will be found fully described at page 677 of the 13th volume of DeCandolle's 'Prodromus.' It came from the mountains at an altitude of 10,000 feet above sea-level from the Rio Frio, between Puebla and the city of Mexico. I have not seen authenticated specimens, but cannot make out from the description that it differs in any way essentially from *S. tuberosum*.

6. SOLANUM SQUAMULOSUM, *Mart. & Gal.*, from alpine woods at Real del Monte, Mexico, No. 1221 of Galeotti's distributed collection. Of this the description is so brief that it is impossible to judge from it. Dunal queries whether it is not a form of *S. verrucosum*.

7. SOLANUM CARDIOPHYLLUM, *Lindley.*—This was received from Herr Uhde along with *S. demissum*, and is described and figured by Lindley at pp. 70 & 71 of the third volume of the 'Journal of the Horticultural Society.' I have examined the type specimen in the Lindley herbarium at Cambridge. It has the general habit of *S. tuberosum*; but there are no small leaflets interspersed amongst the large ones, and the shape of the corolla is quite different, so that it is clearly distinct specifically. The following is a summary of its characters:—Rootstock producing globose white watery tubers an inch in diameter. Whole plant quite glabrous. Stems stout, erect, herbaceous, above a foot long. Leaves glabrous, very dark green, half a foot long, conspicuously pseudo-stipulate; petiole above an inch long; leaflets 5, large, ovate acute, the end one 2–2½ inches long and nearly as broad, the side ones distinctly stalked, the lower pair much the smallest; no small ones interspersed. Flowers in compound cymes, with short peduncles and pedicels. Calyx glabrous; teeth deltoid, as long as the tube. Corolla white, ¾ in. diam., with lanceolate-deltoid acute segments as long as the tube. Stamens longer than the corolla-tube. Style scarcely longer than the stamens. A native of the mountains of Central Mexico, at an elevation of 8000–9000 feet.

8. SOLANUM OXYCARPUM, *Schiede.*—This is a little-known very

distinct species from Central Mexico, described and figured by Schlechtendahl in 'Hortus Halensis,' p. 5, tab. 3. It has slender erect acutely-angled stems a span long, 9–11 oblong-lanceolate very acute sessile leaflets, with no small ones interspersed, lax few-flowered cymes, a small calyx with very acute lanceolate-deltoid teeth, and an ovoid remarkably pointed berry, three times as long as thick. It was collected by Schiede in stony ground at Malpays de Joya, fruiting in the month of September, and its tubers are said to be called "Papa cimarrona" by the natives.

The following numbers of distributed Mexican collections seem to me to belong to forms of *S. tuberosum*, viz.:—F. Müller, 1673; Linden, 240, 244; Galeotti, 1156, 1175; Bourgeau, 346, 1676, 2864; Parry & Palmer, 633, 937, 938; Coulter, 1242. A plant gathered in the mountains of Costa Rica, Endres 196, which I have not myself seen, was identified by my colleague, Mr. N. E. Brown, with a slender-stemmed form of *S. tuberosum* with narrow leaflets and small flowers, found at Xalapa by Galeotti, which closely approaches the Peruvian *S. immite* and the Venezuelan *S. colombianum*.

5. SOUTH-WESTERN UNITED STATES.

1. SOLANUM FENDLERI, *A. Gray*.—This will be found described by Dr. Asa Gray at p. 285 of the 22nd volume of the second series of 'Silliman's Journal,' and under the name of *S. tuberosum* var. *boreale* in the second volume of Gray's 'Synoptical Flora of North America,' at p. 227. It is a native of the mountains of New Mexico and Arizona. The specimens in the Kew herbarium were collected in New Mexico by C. Wright, No. 1589, and in the mountains of Prinos altos by Mr. E. L. Greene. It has finely pubescent stems a span long, longer petioles than in typical *S. tuberosum*, 3–7 thin pilose broad ovate subacute leaflets, with few or no small ones interspersed, few-flowered cymes, small lilac corollas with deltoid segments, and globose fruit. Dr. Torrey states, in the 'Botany of the Mexican Boundary,' p. 151, that in the wild plant the tubers are seldom more than half an inch in diameter.

2. SOLANUM JAMESII, *Torrey*.—This is a thoroughly distinct species, of which we have grown a good supply at Kew this year from tubers furnished by the Agricultural Department at Washington. The following notes were taken from the living

specimens :—Tubers not above the size of small marbles. Stems not above a span long, simple or branched, subglabrous or hairy. Fully-developed leaf 2–3 in. long, including the $\frac{1}{2}$–1 in. petiole; leaflets 5–9, oblong-lanceolate, acute, without any interspersed small ones; end leaflet 1–1$\frac{1}{2}$ in. long; side ones petioled, $\frac{1}{4}$–$\frac{1}{3}$ in. broad, unequally rounded at the base. Cymes few-flowered; pedicels short, finely pilose. Flower-calyx $\frac{1}{6}$ in. long; teeth deltoid, equalling the tube. Corolla white, $\frac{3}{4}$ in. diam.; segments lanceolate-deltoid, as long as the tube. Anthers bright yellow, $\frac{1}{6}$ in. long. Style much exserted. Berry globose. It is a native of the mountains of Colorado, New Mexico, and Arizona, and we have the same plant from Mexico gathered by Bourgeau at Mont Zacoalco, near Guadeloupe, No. 544 of his collection as distributed. A full account of the discovery in Arizona of this and the last, and of the kind of stations in which they grow, will be found in a paper called "The Discovery of the Potato in Arizona," by Mr. J. G. Lemmon, of Oakland, in California, which was read before the Californian Academy of Sciences at San Francisco on Jan. 15, 1883, and published as a pamphlet by Messrs. Bacon and Co., 508 Clay Street, San Francisco.

SYSTEMATIC SUMMARY.

So far as I can judge from the material and information which we possess in England, out of twenty species which have been named, six, viz. *S. tuberosum*, *S. Maglia*, *S. Commersoni*, *S. cardiophyllum*, *S. Jamesii*, and *S. oxycarpum*, possess a fair claim to be considered as distinct species in a broad sense; and of the others eleven, viz. *S. etuberosum*, *S. Fernandezianum*, *S. immite*, *S. colombianum*, *S. Otites*, *S. Valenzuelæ*, *S. verrucosum*, *S. debile*, *S. stoloniferum*, *S. utile*, *S. squamulosum*, and *S. Fendleri*, are certainly, or probably, mere forms or varieties of *S. tuberosum*, and *S. Ohrondii* and *S. collinum* of *S. Commersoni*. The following are brief diagnoses of the species, as I understand them, with their habitats:—

1. SOLANUM TUBEROSUM, *L.*: tuberibus magnis, caule valido, foliis breviter petiolatis, foliolis multijugis ovatis vel oblongis acutis multis minutis interjectis, corollæ lilacinæ vel albæ segmentis brevibus deltoideis, fructu sæpissime globoso, stylo brevi vel elongato.—Andes of Chili, Peru, Bolivia, Ecuador, and Colombia; also in the mountains of Costa Rica, Mexico, and the South-western United States.

2. SOLANUM MAGLIA, *Schlecht.*; tuberibus magnis, caule valido, foliis distincte petiolatis, foliolis paucijugis ovatis acutis, minutis interjectis subnullis, corollæ albæ segmentis brevibus deltoideis, stylo elongato.—Shore of Chili, down south as far as the Chonos Archipelago; also likely Peru.

3. SOLANUM COMMERSONI, *Dunal*; tuberibus magnitudine mediocribus, caule gracili brevi, foliis distincte petiolatis, foliolis 5–9 oblongis obtusis vel subacutis, interjectis minutis nullis, corollæ albæ vel pallide lilacinæ segmentis lanceolato-deltoideis tubo sublongioribus, stylo elongato.—Uruguay, Buenos Ayres, and Argentine territory, in rocky and arid situations at a low level.

4. SOLANUM CARDIOPHYLLUM, *Lindley*; tuberibus magnis, caule brevi valido, foliis distincte petiolatis atroviridibus glabris, foliolis paucijugis ovatis acutis, minutis interjectis nullis, corollæ albæ segmentis lanceolato-deltoideis tubo æquilongis.—Mountains of Central Mexico.

5. SOLANUM JAMESII, *Torrey*; tuberibus minutis globosis, caule brevi gracili, foliis distincte petiolatis, foliolis 5–9 oblongis acutis, interjectis minutis nullis, cymis paucifloris, corollæ albæ segmentis lanceolato-deltoideis tubo æquilongis, fructu globoso. —Mountains of South-western United States and Mexico.

6. SOLANUM OXYCARPUM, *Schiede*; tuberibus minutis, caule brevi gracili, foliis distincte petiolatis, foliolis 9–11 oblongo-lanceolatis acuminatis, interjectis minutis nullis, cymis laxis paucifloris, floribus ignotis, fructu ellipsoideo cuspidato.—Mountains of Central Mexico.

ECONOMIC SUGGESTIONS.

What Lord Cathcart asked for were any suggestions that a botanist might be able to give, founded upon his knowledge of the potato-plant and its geographical distribution, that were likely to be of practical value to cultivators. In reviewing the subject the considerations of this character that occur to me are these:—

In the first place, it always seems to me that cultivators work upon the tacit assumption, if I may so express it, that the one object in life of the potato-plant is to grow potatoes, and that this assumption has no sound foundation in fact or reality. *Solanum* is one of the largest genera in the vegetable kingdom. About 900 names stand in the botanical books as species, and Bentham and Hooker estimate that probably 700 of these are really distinct. Of these 700 it is only six that grow potatoes at all, and the remainder all maintain their hold in the world as most plants do, by means of their flowers, fruits, and seeds. I do not think that the Chilian *S. etuberosum* and Mexican *S. suaveolens* are more than mere forms of *S. tuberosum*, and they are said to be quite destitute of tubers; and there is the fact noted by Sir J. D. Hooker, that when *S. Maglia* was first grown at Kew, for two years it did not yield any tubers. A great many of the cultivated varieties rarely produce flower and fruit. Any plant brought to the tuber-bearing state is in a disorganized unhealthy condition, a fitting subject for the attacks of fungi and aphides. The great difficulty with which we have to contend in fighting disease is that in the potato, as in other cultivated species, we grow in great masses plants which in a state of nature are scattered amongst others. The relationship of tuber to fruit is so clearly shown by one of the experiments of Mr. T. A. Knight that I will cite it in this connection. "Every gardener knows" (he writes in 'Philosophical Transactions,' 1806, p. 297) "that early varieties of the potato never afford either blossoms or seeds; and I attributed this peculiarity to privation of nutriment, owing to the tubers being formed preternaturally early, and thence drawing off that portion of the true sap which, in the ordinary course of nature, is employed in the formation and nutrition of blossoms and seeds. I therefore in the last spring planted some cuttings of a very early variety of the potato, which had never been known to bloom in garden-pots, having heaped the mould as high as I could above the level of the pot, and planted the portion of the root nearly at the top of it. When the plants had grown a few inches high, they were secured to strong sticks, which had been fixed erect in the pot for that purpose, and the mould was then washed away from their stems by a strong current of water. Each plant was now suspended in air, and had no communication with the soil in the pots, except by its fibrous roots; and as these are perfectly distinct organs from the runners that generate and feed the tubers, I could readily prevent the formation of them. Efforts were soon made by every plant to generate runners and tubers, but these were destroyed as soon as they became perceptible. An increased luxuriance of growth now became visible in every plant, numerous blossoms were emitted, and every blossom afforded fruit."

Secondly, a suggestion as to what might be done towards widening the power of climatic adaptation of the cultivated potato. There are certainly six distinct species of tuber-yielding *Solanum*, each with its own distinctive climatic peculiarities. I went to Mr. Sutton's trial-grounds specially to investigate this point, and came away fully satisfied that all the numerous varieties in cultivation had originated from *S. tuberosum* *, as here defined. As far as climate is concerned, it cannot be doubted that *Solanum Maglia* (or the Darwin potato as we might suitably christen it in English) would be better fitted to succeed in England and Ireland than *S. tuberosum*, a plant of a comparatively dry climate. We have indisputable testimony that *S. Maglia* and *S. Commersoni* yield readily an abundant supply of eatable potatoes. What I should suggest is, that these should be brought into the economic arena, and thoroughly tested as regards their economic value, both as distinct types and when hybridized with the innumerable *tuberosum* forms.

EXPLANATION OF THE PLATES.

Plate XLI.

Solanum tuberosum, from a wild specimen gathered in the Chilian Andes by Bridges, No. 719.

Plate XLII.

Solanum Maglia, from a wild specimen gathered by Darwin in the Chonos Archipelago.

Plate XLIII.

Solanum cardiophyllum, from Lindley's type specimen, from the Chiswick garden, 1847.

Plate XLIV.

Solanum Commersoni, from a wild specimen gathered at Montevideo by Gibert.

Plate XLV.

Solanum Jamesii, from a wild specimen gathered in New Mexico by C. Wright, No. 1588.

Plate XLVI.

Solanum oxycarpum, after Schlechtendahl, from a wild specimen gathered in Central Mexico by Schiede.

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* Four old cultivated specimens in the Sloane herbarium at the British Museum and one from Philip Miller all belong to typical *S. tuberosum*.

The Structure and Affinity of *Sphæria pocula*, Schweinitz.

By M. C. Cooke, A.L.S.

[Read January 17, 1884.]

(Plate XLVII.)

It has always been to me a greater pleasure to clear from obscurities, and illustrate by new observations, the dubious or little-known species of old authors, than to propose new species or new genera, although circumstances so often compel me to the latter course. The special instance which I desire now to place before this Society is a species described by Schweinitz, and endorsed by Fries, of which the fructification has been hitherto unknown or disregarded, and called by him *Sphæria pocula.* The earliest record I find is the description by Schweinitz himself in the 'Journal of the Academy of Natural Sciences of Philadelphia' for 1825 (vol. v. p. 7), in the following words:—"*Sphæria* (*Poronia*) *pocula*, L. v. S. Resembling an inverted *Peziza*, bursting fasciculately from beneath the epidermis, showing 2–4 pedicellate, pendulous cupulas in a bunch, the margin of the cupula bent in and thick, the disk flat and pruinose; colour of the whole fungus white, tinged with brown; size of each cupula about one or two lines. The perithecia are small, oblong, lutescent, crowded in a single tier (monosticha), totally immersed in the pulverulently pruinose disk, with black and scarcely prominent ostiola; substance internally suberose, albescent; externally, the cupulæ and proportionably thick stipes into which each is contracted are somewhat squamose or furfuraceous (plate ii. fig. 6). A most remarkable species communicated to me by Dr. Torrey, bursting from beneath the epidermis of *Fraxinus*. It is strictly of this section, and the only one, besides the European *Poronia*, which I consider genuine."

Subsequently, that is in 1828, Fries published a brief diagnosis of this same species in his 'Elenchus' (vol. ii. p. 60) under the name of *Sphæria* (*Poronia*) *pocula*, Torrey, without quoting the above, which probably he had never seen, and citing Torrey, not Schweinitz, as the authority. The brief description was probably drawn up by himself from specimens communicated to him, perhaps by Dr. Torrey.

In the 'Synopsis Fungorum,' published by Schweinitz in 1834 (p. 189), the following and more detailed description is given:—

"Suberosa-coriacea, stipitata; stipitibus fasciculatim ex epidermide prorumpentibus, incurvis, sensim dilatatis in cupulas obverse pendulas, extus ex albido-fuliginosis, demum subfurfuraceis; stipites semper crassi sunt. Cupulis excavatis, disco planiusculo, margine crasso, obtusato, inflexo-pulverulento. Peritheciis immersis disco, minutis, monostichis lutescentibus, ostiolis nigris, vix prominentibus. Substantia cupularis intus ex albo-fuliginea aut badia, suberosa. Altitudo cæspitis et singularium cupularum 4–5 lineas, diameter disci 2–5 linearis. Ætate provectiori, stipites fusco nigrescunt."

In all these instances the species was classed with the Sphæriacei, under what was then considered the subgenus *Poronia*, as an ally of the widely-diffused *Poronia punctata*. More recently it has been transferred by some authors to *Hypocrea*; and in this view I believe the Rev. M. J. Berkeley concurred. Fries, in his Summa Veg. Scan. (1846), placed it in the Dichænacei, in a genus almost especially designed for its reception, under the name of *Enslinia* (p. 399), which he characterized as analogous to *Poronia*. Wherever it was placed it was taken for granted that it was ascomycetous, although evidently its structure was never properly investigated. With a single specimen to operate upon, derived directly from Schweinitz himself, and undoubtedly authentic, I have arrived at a different conclusion.

As already indicated, the entire fungus consists of a furfuraceous cup-shaped brownish receptacle, about one or two lines in diameter, with a rather thick stem, bursting through the back of *Fraxinus*, either singly or in clusters, after the manner of a species of *Peziza* or *Cenangium*, but with this peculiarity, that the punctate disk was turned from the light by the pendulous habit, which is characterized as universal. Schweinitz says, "Cupulas obverse pendulas," and again, "semper cupulis universis pendentibus." This habit will be referred to again hereafter, although apparently of slight importance here.

The disk is flattened and whitish, surrounded by the elevated margin of the cup, the surface sprinkled with apparently blackish points or dots, described, both by Fries and Schweinitz, as black ostiolæ of the supposed immersed perithecia. In the genus *Poronia*, as is well known, the perithecia are immersed in the substance of the disk, and only the black ostiolæ are seen on the surface; from analogy, and a superficial examination with a pocket lens, the dots on the disk of the *Pocula* were assumed to be of the same character, whereas the microscope shows this to have been an error, the supposed ostiolæ being nothing more than pores, or openings in the disk, with no alteration of colour. By soaking in water for an hour or two my specimen became quite fleshy in its character, and sections were readily cut through the disk, so thin as to reveal the entire structure. This may be briefly described:—The pores which are visible on the surface penetrate the disk in parallel channels, at short distances apart, and are cylindrical, several times longer than broad, with no perithecia (as supposed by Schweinitz and Fries), but lined throughout with a layer of elongated elliptical cells, closely packed side by side, and in no way differing from the basidia which line the tubes of a *Polyporus*. In some instances these basidia were still crowned by delicate spicules, seen only when stained by aniline. The tubes contained numerous hyaline spherical spores, about ·004 millim. diameter, and these seem to have been the cause of the white pulverulent appearance of the disk. Between the parallel tubes the substance was continuous, consisting of interlacing fibres proceeding from the base of the basidia inwards and downwards, in the direction of the stem. Hence the structure of the cup was a delicate fibrous tissue, perforated by parallel pores, opening in the disk; the whole internal surface of such pores being hymenial, lined with closely-packed basidia, originally having delicate spicules at their apices, bearing globose hyaline spores.

Such a structure is undoubtedly Hymenomycetal, and no insinuation of Ascomycetal; in fact, it is nothing else than the structure of *Polyporus* or *Porothelium*, with a preference for the former; and the species should in future be designated as *Polyporus* (*Mesopus*) *Pocula* (Schwein.), allied perhaps in habit to *Polyporus pendulus*, but in substance to *Polyporus Rhipidium*. The objections to this view cannot be formidable, if the structure above described is accurate. The substance is no more fleshy than that of many Polyporei. The size is often scarcely exceeded in *Polyporus Rhipidium*, and hence dimensions would be no obstacle. The cup-shape is almost the same in *Polyporus pendulus*, although not so remarkably Pezizæform. In fact all the essential characters of *Polyporus* are present; and although shaped so much like a *Peziza*, we have the authority of Schweinitz for urging that the disk is not permanently and by preference exposed *to* the light, as in *Peziza* and *Poronia*, but turned *from* the light, by the cups always becoming pendulous, as is the habit in *Polyporus* and other Hymenomycetes.

Because Fries and Schweinitz were misled by external resemblance to refer this plant to Sphæriacei (since they give no indication of having observed its structure under the microscope), it cannot be contended that this is not the species of Schweinitz. When it is remembered that the free globose spores are identical in size and form with the spore-joints in many species of *Hypocrea*, some excuse may be made for the supposition that it might be a species of *Hypocrea*. I do not know that any except the original specimens have ever been found; and it is not surprising that the fortunate possessors of a single cup or two should have hesitated to cut in pieces and examine its structure as I have ventured to do, in the hope of setting the question at rest as to what is the *Sphæria pocula* of Schweinitz.

DESCRIPTION OF PLATE XLVII.

Fig. 1. Cups *in situ*, natural size; 2, 3. Magnified bunches; 4. Magnified section. All after Schweinitz.
5. Section of cupule, magnified 12 times.
6. Section of hymenium, further magnified.
7. Section of tubes, showing basidia lining them.
8. Arrangement of basidia forming walls of tubes.
9. Separate basidia, with spicules.
10. Spores. Figs. 8, 9, & 10 × 500 diameters.

Note.—Since the above was in type I have discovered that Berkeley and Curtis, in the fourth volume of the 'Proceedings of the American Academy of Arts and Sciences' (1860), describe this species anew as *Polyporus Pocula*, Berk. & Curt., but the description appears always since to have been neglected, and even to have passed from the memory of the Rev. M. J. Berkeley himself.

On the Life-history of *Æcidium bellidis*, DC. By Charles B. Plowright, M.R.C.S. (Communicated by W. T. Thiselton Dyer, C.M.G., F.L.S.)

[Read March 20, 1884.]

The Æcidium upon the common Daisy (*Bellis perennis*, L.) has hitherto, both by British and continental botanists, been regarded as a mere variety of *Æcidium compositarum*, Mart. During the past four months this fungus has been made the subject of experimental culture, by which it has been demonstrated that this view is incorrect, and that this *Æcidium* is a true heteræcismal Uredine. This *Æcidium* differs from its allies in the time it appears, namely during the late autumn and winter months, from November to January. It has been made the subject of special observation for many years past, as it recurs annually upon its host-plant in four localities near Kings Lynn, and is never accompanied by any other spore-form upon the same plant. During the past four months these localities have been frequently visited, and the daisies, as well as the other plants growing near them, carefully from time to time examined, with the view of discovering its life-history. The subjoined cultures were then made; the only point about which calling for remark is the length of time which elapsed between the placing of the promycelial spores upon the host-plant and the subsequent appearance of the spermogonia. In most Uredines only about a week or ten days elapse before the parasite makes its presence visible. In this case, however, the interval was considerably longer: doubtless this is due to the fact that all the processes of vegetation are carried on much more slowly during the winter than is the case in summer. The same remark applies to the production of the uredospores upon *Luzula campestris* from the æcidiospores.

The *Æcidium* is not a very common species, and has always hitherto been met with in grassy pastures.

Two *Pucciniæ* occur upon various species of *Luzulæ*: one, already known as British, has smooth elliptical uredospores, *P. oblongata* (Link)=*P. Luzulæ*, Lib. The other, not previously recorded from this country, *P. obscura*, Schröt., which has subglobose rough uredospores, is connected with *Æcidium bellidis*.

Exp.	Plant infected.	Infecting material.	Date of infection.	Date of first appearance of uredo.
235...	*Luzula campestris.*	*Æcidium bellidis.*	19 Nov., 1883.	20 Jan., 1884.

Exp.	Plant infected.	Infecting material.	Date of infection. 1883.	Date of appearance of spermogonia. 1884.	Date of appearance of æcidiospore. 1884.
237	*Bellis perennis.*	*Puccinia obscura.*	Dec. 12.	Jan. 6.	Jan. 25.
238	,, ,,	,, ,,	Dec. 12.	Jan. 6.	Jan. 25.
239	,, ,,	,, ,,	Dec. 12.	Jan. 6.	Feb. 8.
240	,, ,,	,, ,,	Dec. 12.	Jan. 6.	Jan. 25.

On some Diatomaceæ from the Island of Socotra. By F. Kitton, Hon. F.R.M.S. (Communicated by Lieut.-Col. H. H. Godwin-Austen, F.R.S., F.L.S.)

[Read March 20, 1884.]

(Plate XLVIII.)

The material in which the following Diatomaceæ were found was obtained by Prof. Bayley Balfour during a short visit to the island in the cold season of 1880, and consisted of a mass of water-plants containing small freshwater shells (the plants were I believe gathered and brought to England as botanical specimens, and the shells were living on them). Colonel H. H. Godwin-Austen, to whom they were sent, after picking out the shells, washed the plants, and placed a drop of the washing under the microscope and detected some diatoms in it; the remainder he sent to Dr. Bossey of Redhill, from whom I received it with a request that I would make "a list of the species contained in it; to report whether it contained any one species peculiar to the island, and whether the whole collection or any one species may indicate connexion with Africa or India by land- or water-carriage, or by former continuity of land."

After cleaning the crude material and eliminating the vegetable *débris* and coarse sand, sufficient diatoms and fine sand remained to fill about $\frac{3}{16}$ of a small homœopathic tube. This I divided into two densities: the heavier, containing the larger forms and sand, was minute in quantity, yielded a new species of *Cerataulus*, but by no means in abundance. I have probably seen about thirty specimens; but, from its delicate nature, most of them were broken.

The genus *Cerataulus* was constituted by Ehrenberg in 1843 to receive a single species, *C. turgidus*. Grunow, in 1863, amended the genus and added *Biddulphia lævis*, Ehr., and two new species of his own. All species of the genera *Cerataulus* and *Biddulphia* are marine. Although I do not think that there is sufficient generic distinction to warrant the constitution of the genus *Cerataulus*, I have retained it for the Socotran diatom from its great resemblance to *C. lævis*. Indeed the resemblance is so close, that a casual observer would at once refer it to that species. A careful examination and the employment of a high power show some important distinctions: the striæ of the latter are coarser, and the puncta of which they are composed are arranged in straight lines reaching from the centre to the circumference; the processes are also more conspicuous from being less marginal: it is, moreover, a truly marine species, frequently occurring in dredgings attached to marine Algæ. On the former the striæ are delicate, and the puncta form straight and slightly curved lines a short distance from the margin only, the larger portion of the valve being closely but irregularly covered with small moniliform granules, which sometimes appear to be arranged in rosette-like patterns. These differences, together with its freshwater habitat, are of sufficient value to constitute a new species, which I characterize under the name of:—

CERATAULUS SOCOTRENSIS, *F. Kitton*, n. sp.

Frustulo ventro adspectu cylindrico; cingulo dense punctato; valvulis circularibus vel late ellipticis, leviter bullato infra 2–4 processos marginales; striis delicatis, prope marginem radiatim, per reliquum superficies valvuli compacte sed irregulariter dispositis; setæ 3 vel pluræ, in medio sitæ. Diametro ·0023–·0028 pollic.

Frustule in front view cylindrical, cingulum very finely punctate; valves circular or broadly elliptical, slightly bullate below the marginal processes, which vary from 2 to 4 in number; striæ delicate, radiating near the margin, closely but irregularly disposed on the remainder of the valve; three or more short setæ occur midway between the centre and circumference. Diameter ·0023 to ·0028 of an inch.

Island of Socotra; attached to freshwater plants.

The following form, although not a new species, has, I believe, only been found in two localities until detected in the Socotran gathering, viz. in material collected by Dr. Unger in the island of Cyprus, and described by Herr Grunow in 'Verhandl. der k.-k. zool.-bot. Ges.' Bd. xiii. 1863. It was subsequently found by Colonel Mason in Belgaum, forming large masses; in some he sent me I found filaments $\frac{3}{5}$ of an inch in length, and exceeding the $\frac{1}{60}$ of an inch in breadth: in a dry state it has a beautiful silvery green appearance. In single frustules it very closely resembles *Synedra Ulna*. The frustules cohere very firmly, and when treated with strong acids the filament usually separates at the connecting-zones rather than where the frustules adhere.

FRAGILARIA UNGERIANA, *Grun., l. c.*

Frustules linear-narrow, with conspicuous marginal puncta, firmly coherent, often forming filaments of considerable length; valves narrow-linear, suddenly narrowing near the rounded apices; margins punctate; the striæ become delicate as they approach the centre. Length of valve ·0090–·0166, breadth ·0003.—Cyprus; Belgaum (India); island of Socotra.

The remaining forms observed are such as are usually met with in freshwater gatherings. It will be seen that, with the exception of two or three species of *Navicula*, they are all parasitic:—

Cocconema lanceolatum.
—— cymbiforme.
—— Cistula.
Cymbella bengalensis.
Gomphonema intricatum, var.
—— affine.
—— acuminatum.
—— Turris.
—— constrictum, var. subcapitatum.
Cocconeis pediculus.
Cyclotella Meneghiniana, var.
Eunotia pectinalis.
Navicula sphærophora.
—— ovalis.
Amphora ovalis.
Mastoglœa Dansei.
—— elliptica.
Epithemia gibberula.
Achnanthes linearis.

The Diatomaceæ above recorded do not afford any indication of connexion with India or Africa, either by bird- or water-carriage or former continuity of land. Diatomaceous gatherings from localities wide apart are sometimes difficult to distinguish from each other. This is not unfrequently the case with fossil deposits, particularly those of freshwater origin.

DESCRIPTION OF PLATE XLVIII.

Fig. 1. *Cerataulus socotrensis*, Kitton, n. sp. × 600 diam.
2. Frustule of *C. socotrensis*. × 200.
3. *Cerataulus lævis* (Ehrenb.). × 400.
4. *Fragilaria Ungeriana*, Grun. Frustules, × 350.
5. Ditto. Part of valve, × 600.
6. *Cymbella bengalensis*, Grun. × 700.

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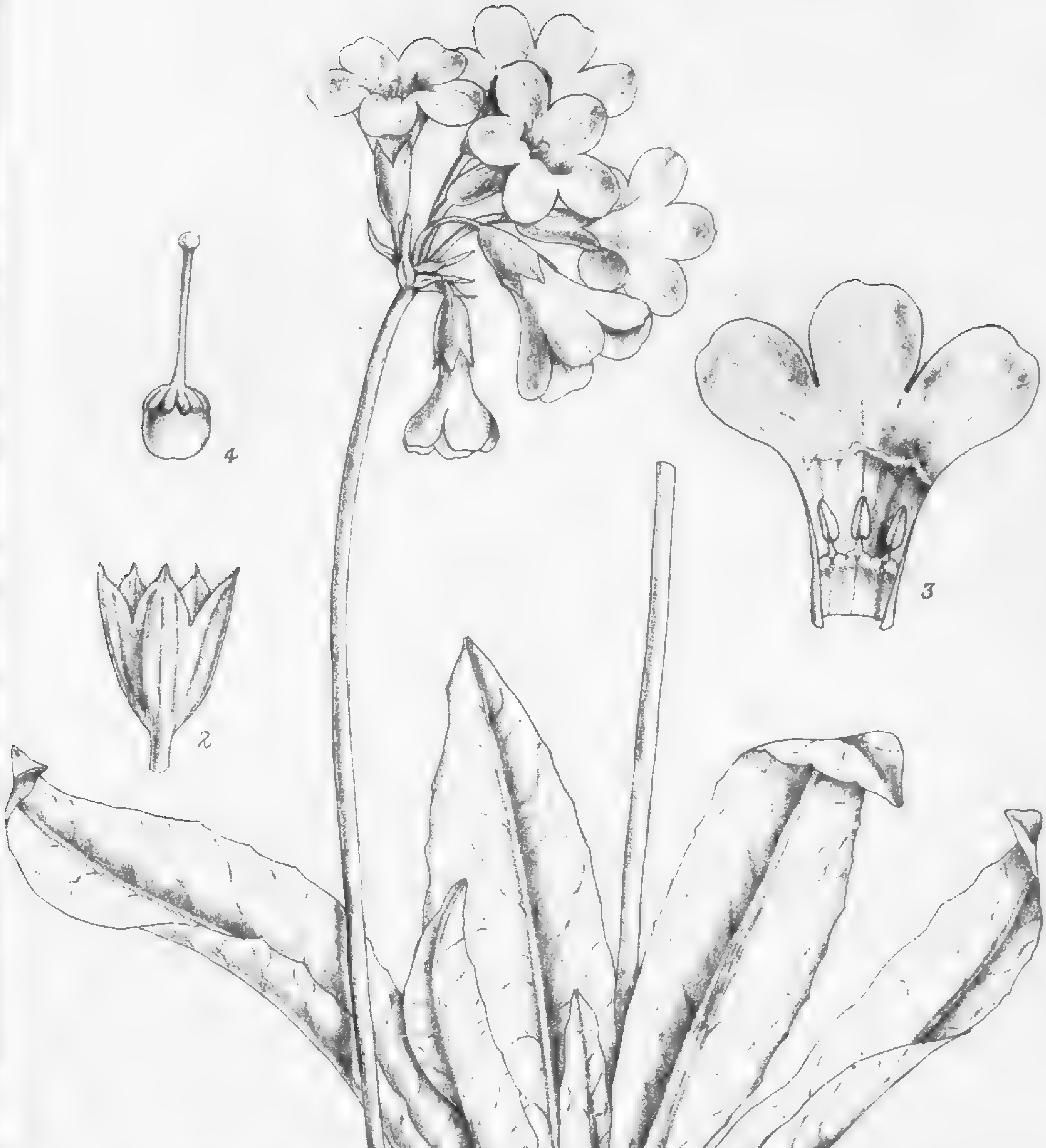

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G Watt.

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(A) PRIMULA TIBETICA (B) P. UNIFLORA.
(C) P. SOLDANELLOIDES

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Fitch imp

G. Watt.

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J.N.Fitch lith. (A) PRIMULA MUSCOIDES *Var.* TENUILOBA. Fitch imp

(B) P. REPTANS (C) P. SAPPHIRINA (D) P. STIRTONIANA.

G. Watt.

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M. Smith lith.

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(B) ANDROSACE CROFTII.

M. Smith lith.

Fitch imp

ANDROSACE ROTUNDIFOLIA *var.* STRACHEYI.

M. Smith lith.

Fitch imp

ANDROSACE GERANIIFOLIA.

G. Watt.

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M. Smith lith.

Fitch imp.

(A) ANDROSACE CHAMÆJASME *var.* CORONATA
(B) A. ROTUNDIFOLIA *var.* THOMSONI.

G. Watt.

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M Smith lith
Fitch imp.

(A) ANDROSACE SELAGO (B) A. MUSCOIDEA.

W.H. Fitch del.

J.N. Fitch lith.

Fitch imp.

TACSONIA FLORIBUNDA, *Var.* MAJOR.

W.H.Fitch del.

J.N.Fitch lith.

Fitch imp.

1-3. PASSIFLORA EMINULA. 4-5 P. LORIFERA.

Otto Tepper del. ad nat.

Fig. 1.
(slightly enlarged)
Fig. 4.
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×2
Fig. 2.
Fig. 3.
×2

MALFORMED LEAVES OF BEYERIA OPACA.

J.N.Fitch lith.
J.N.Fitch imp.

M. Smith del.

Hammond lith.

Hanhart imp

SPARMANNIA DISCOLOR, *Baker.*

M. Smith del.

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Hammond lith.

Hanhart imp.

MICROSTEIRA CURTISII, *Baker*.

M Smith del. LINN. SOC. JOURN. BOT. VOL. XX. PL. 24.

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A Hammond lith. SCHISMATOCLADA PSYCHOTRIOIDES, *Baker*. Hanhart imp.

A. Hammond lith. TETRASPIDIUM LAXIFLORUM, *Baker*. Hanhart imp.

M Smith del
Hammond lith

MONACHOCHLAMYS FLAGELLARIS

Hanhart imp

T G Baker.

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M Smith del
Hammond lith.

FORSYTHIOPSIS BARONI

Hanhart imp

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DIDYMOPLEXIS PALLENS, *Griffith.*

Hanhart imp.

plant, flower, and clongated pedicels bearing mature capsules.

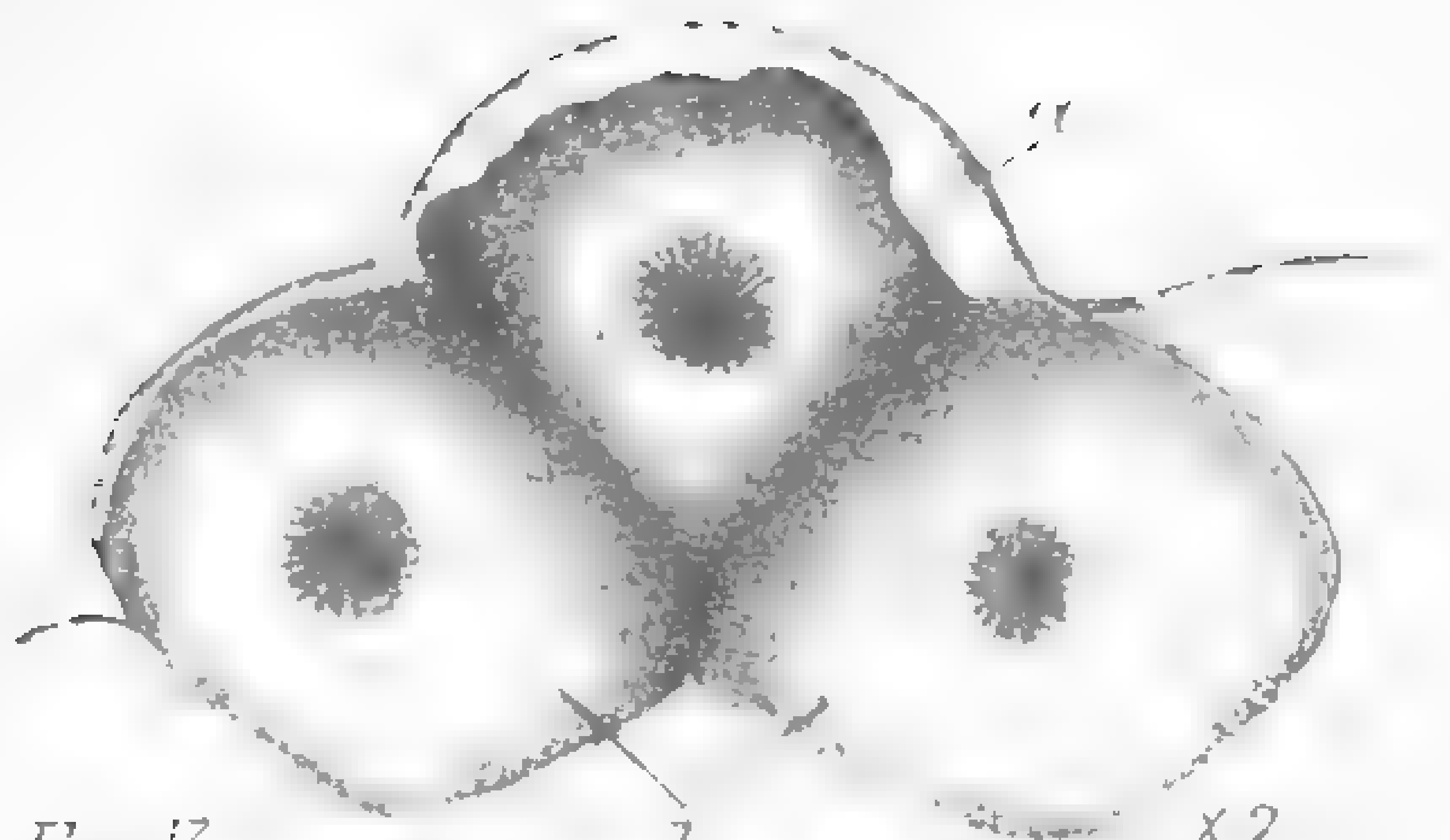
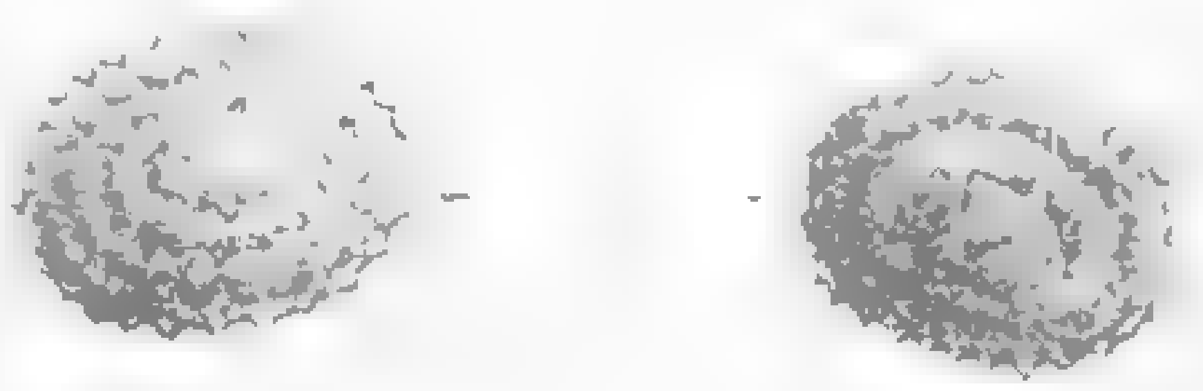


Fig. 3



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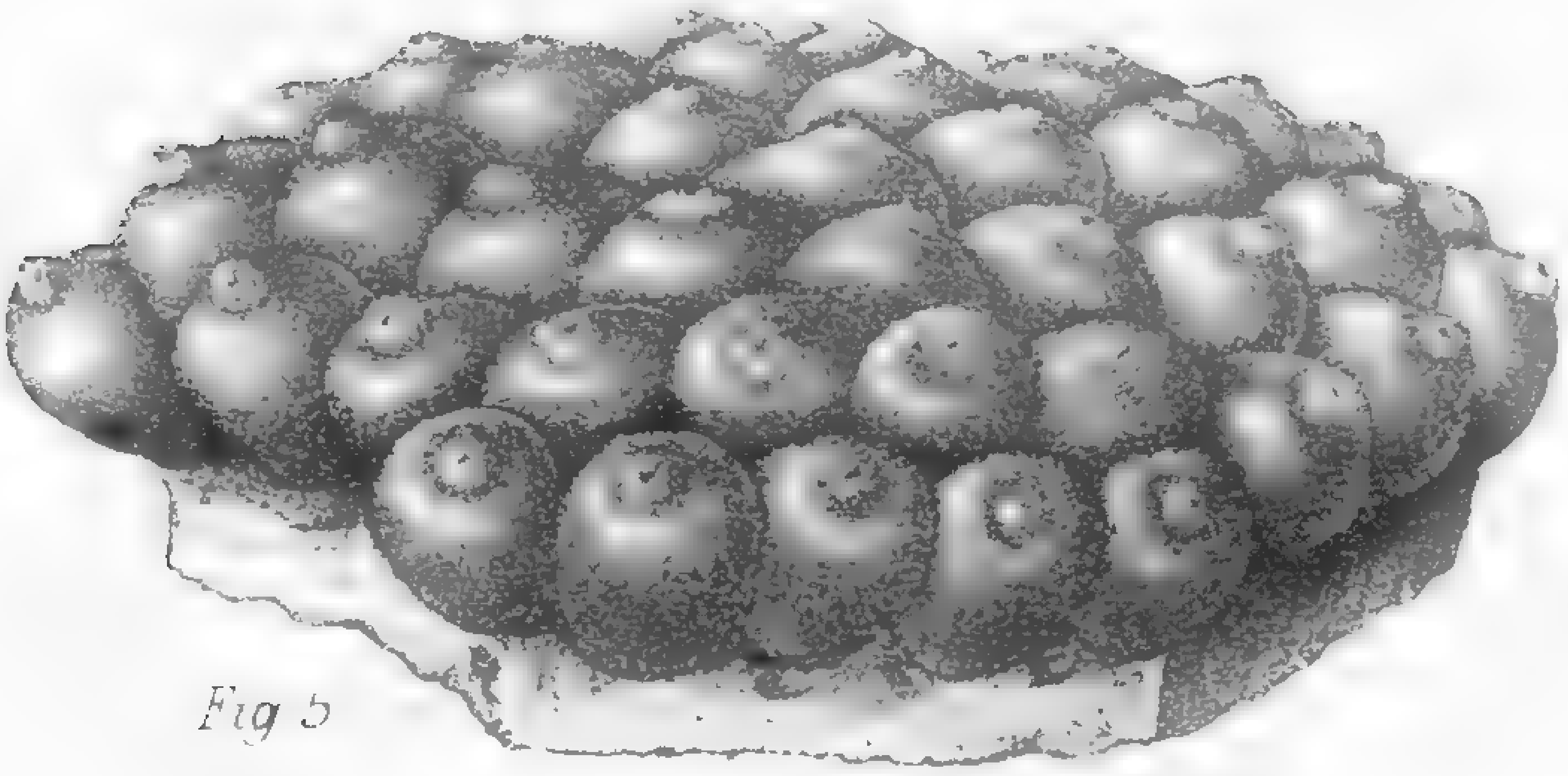
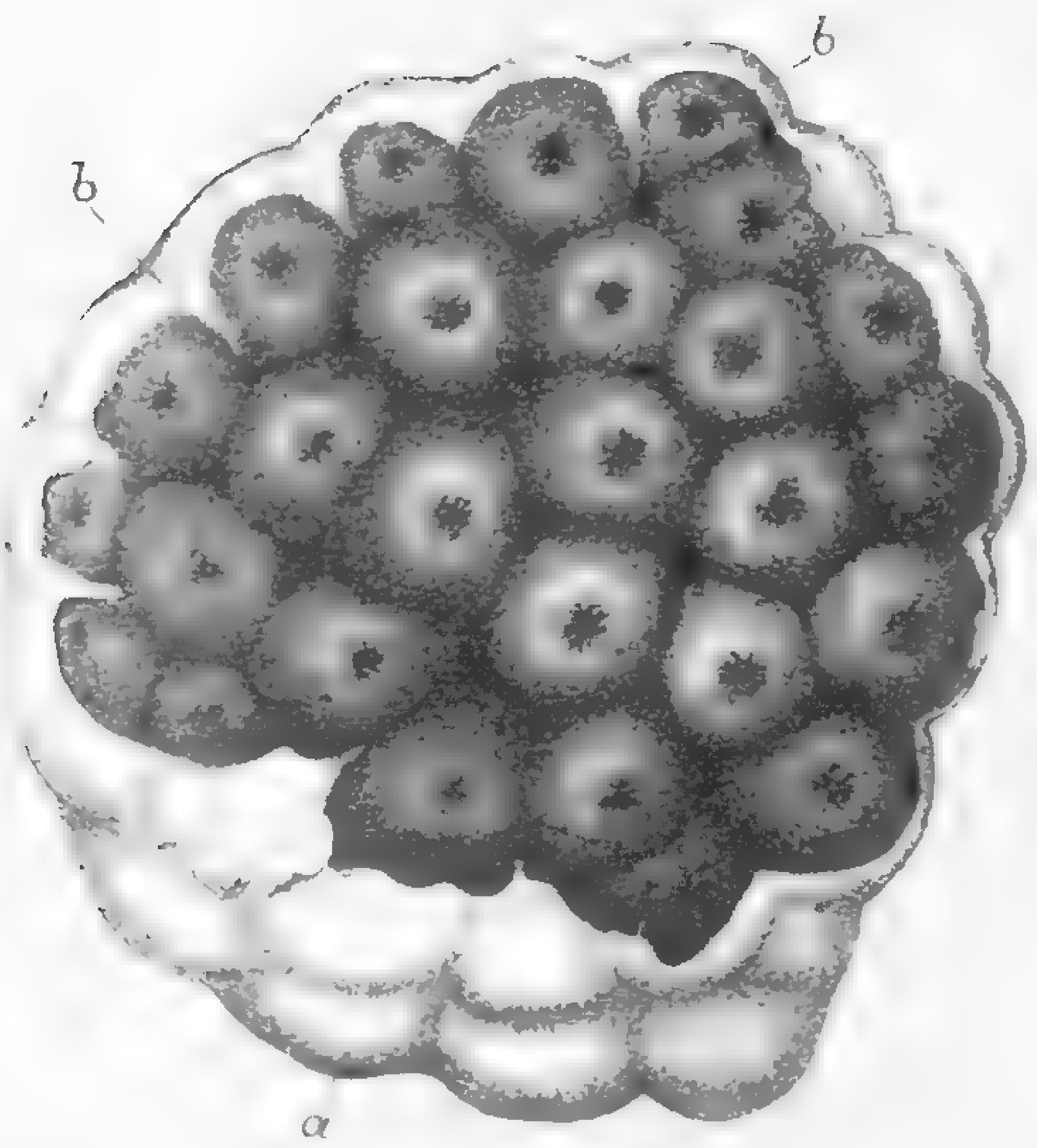


Fig. 5

Fig. 1.



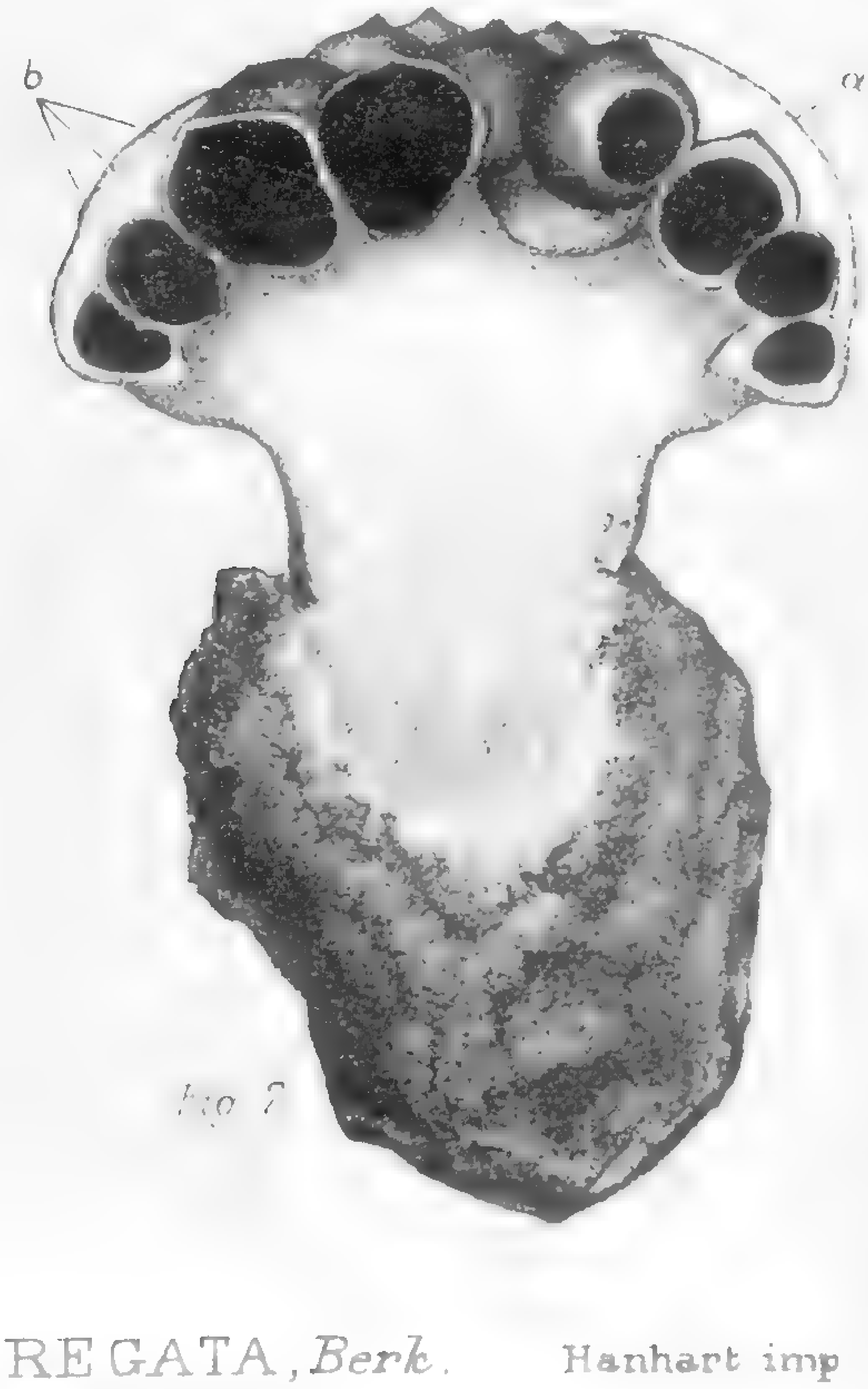


Fig. 2

[illegible] del. et lith. BROOMEIA CONGREGATA, *Berk.* Hanhart imp.

showing outer and inner peridia

1
3
4
5
6
9
2
11
8
7
10

J.N.Fitch lith.

HEMICAREX & ALLIES.

Fitch imp.

1-2. Carex uncinoides. 3-4. Hemicarex Hookeri. 5-6. H. laxa.
7. Kobresia nitens 8. Schoenoxiphium Burkei 9-11 S. Thunbergii.

S. Gardner.

2
3
4
8
6
7
5
10
11
12
9
16.
15
13
14
20a
20
22
17
18
21
24
23
19

ejeau del.

FRUIT OF ALNUS RICHARDSONI, &c.

Mintern Bros imp.

1
st
c
x87
2
x87
3
x80
4
x45
5
x44
6
x44
7
x23
8
x37
o
9
o
x37
10
o
x14
11
x3
12
x20

G.Lister del. CAPSULE-DEVELOPMENT OF LYCHNIS DIURNA. J.N.Fitch lith.

1
×192
3
×192
2
×192
4
×192
5
×192
6
×192
7
×96
8
×37
9
×192
12
×192
10
×192
11
×192
13
×105
14
×65

G. Lister del.

J. N. Fitch lith.

CAPSULE-DEVELOPMENT OF
1-8 SAGINA APETALA 9-14 SPERGULA ARVENSIS.

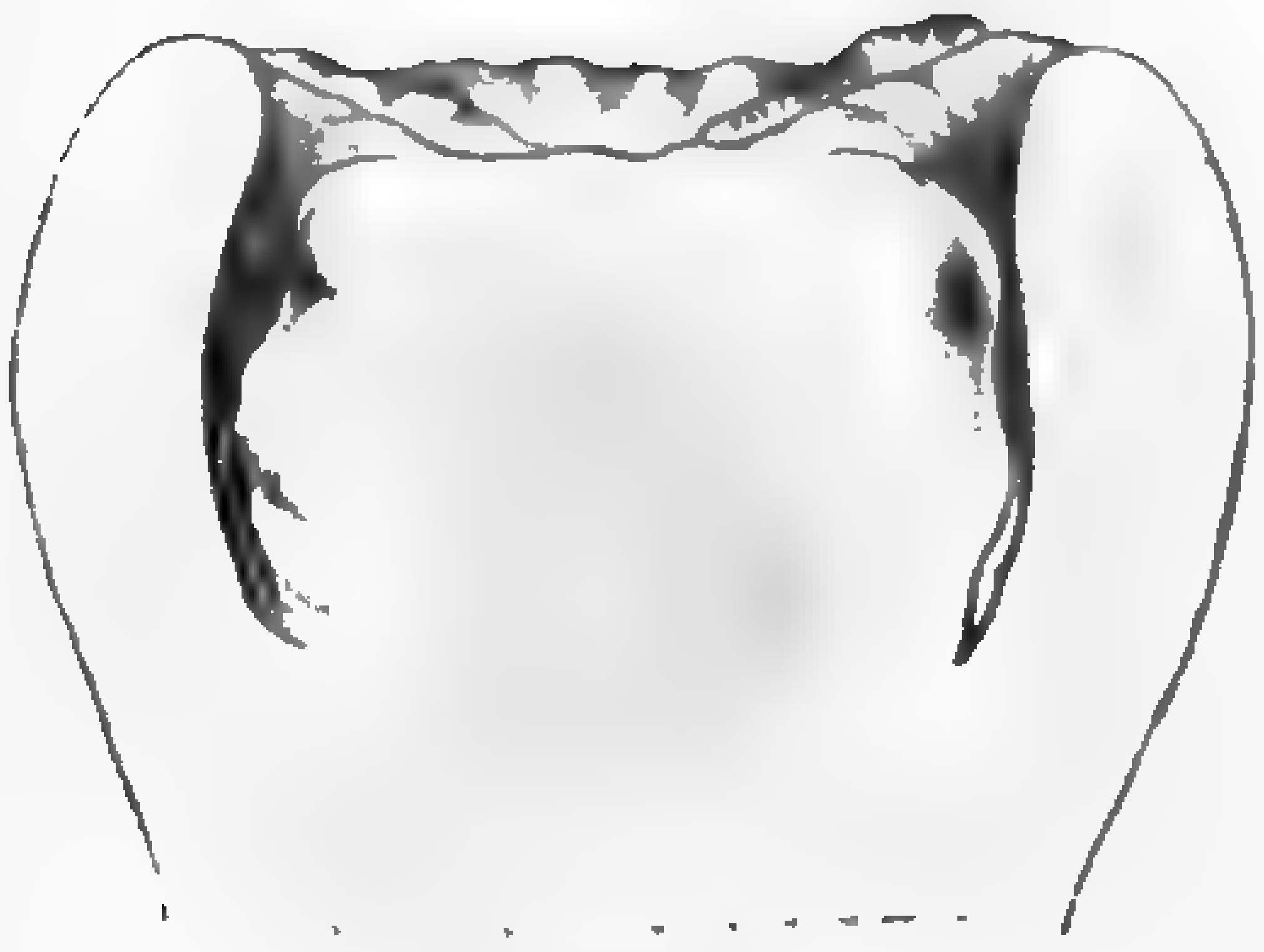
1
× 96
3
× 105
2
× 96
4
× 87
5
× 87
6
× 46
7
× 20
8
× 6
9
× 192
10
× 96
11
× 96
12
× 96
15
× 20
14
× 87
13
× 96

G. Lister del.

CAPSULE-DEVELOPMENT OF
1-8 CERASTIUM TRIVIALE 9-15 C. QUATERNELLUM.

J N Fitch lith

4



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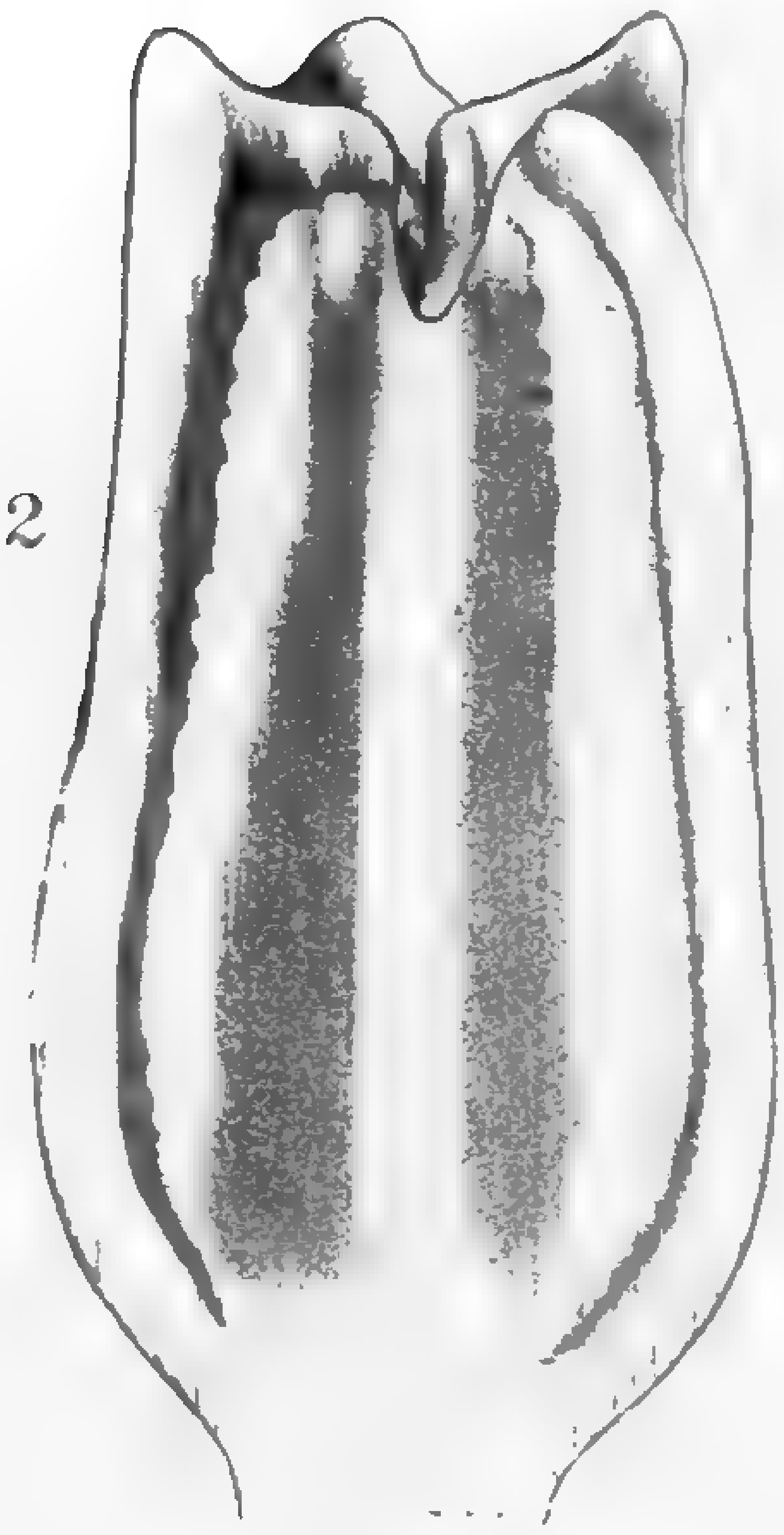
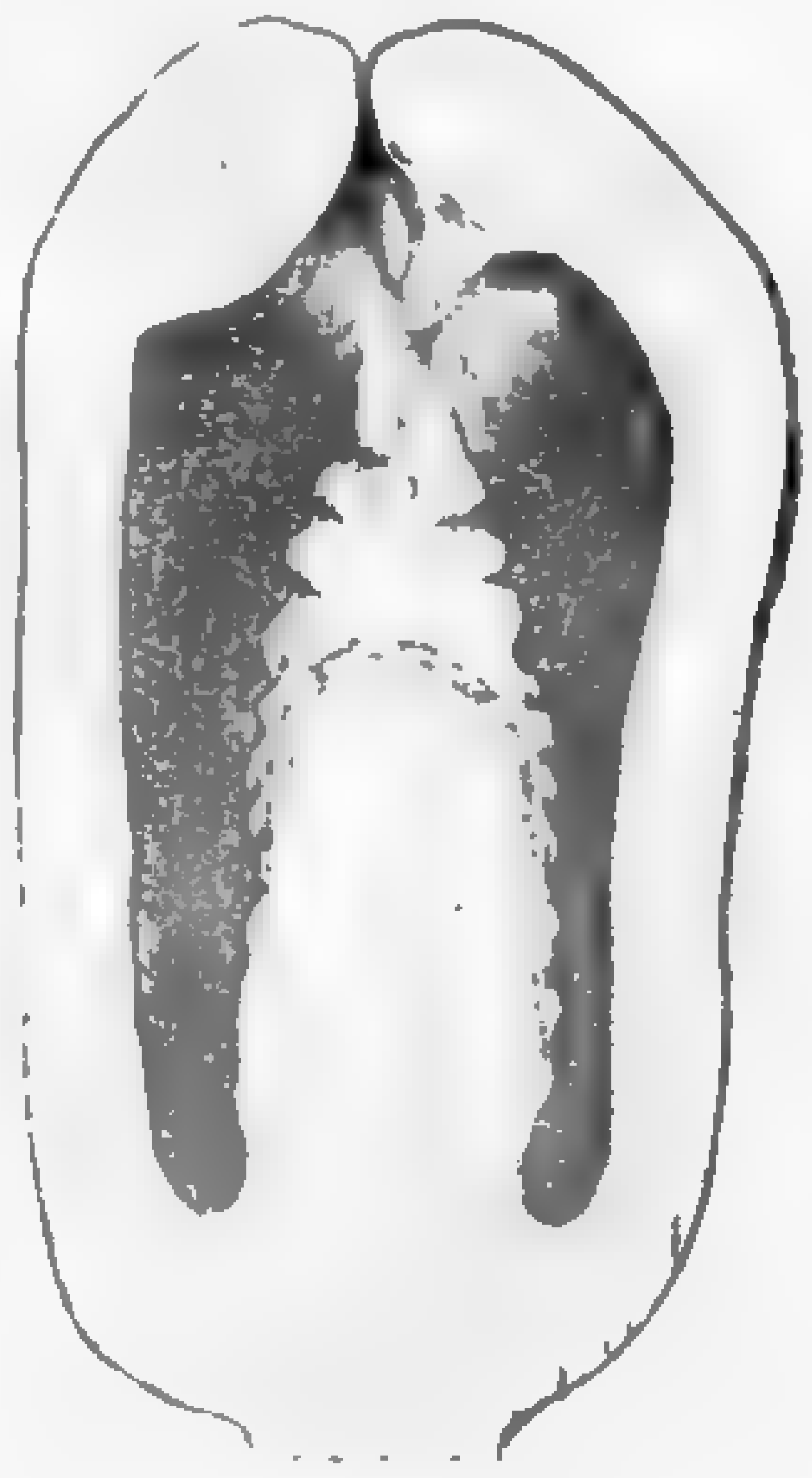


1



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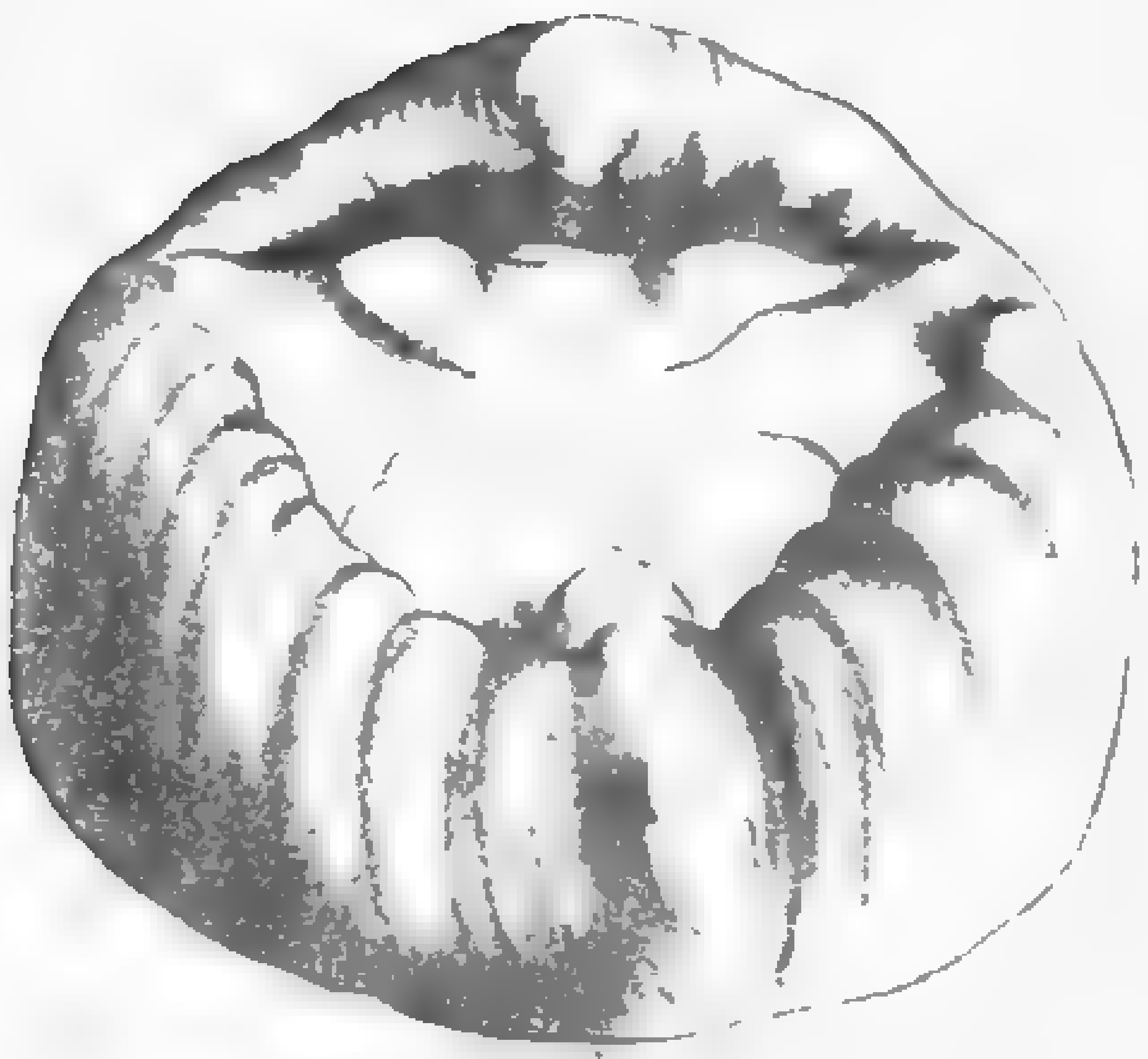

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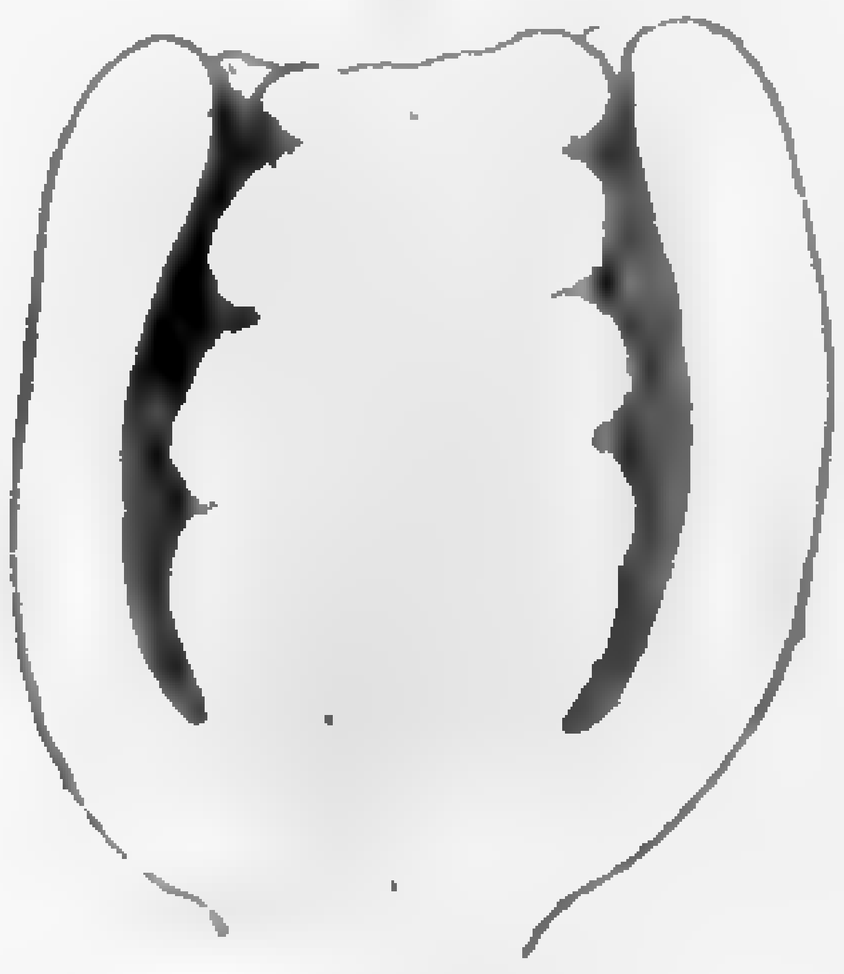

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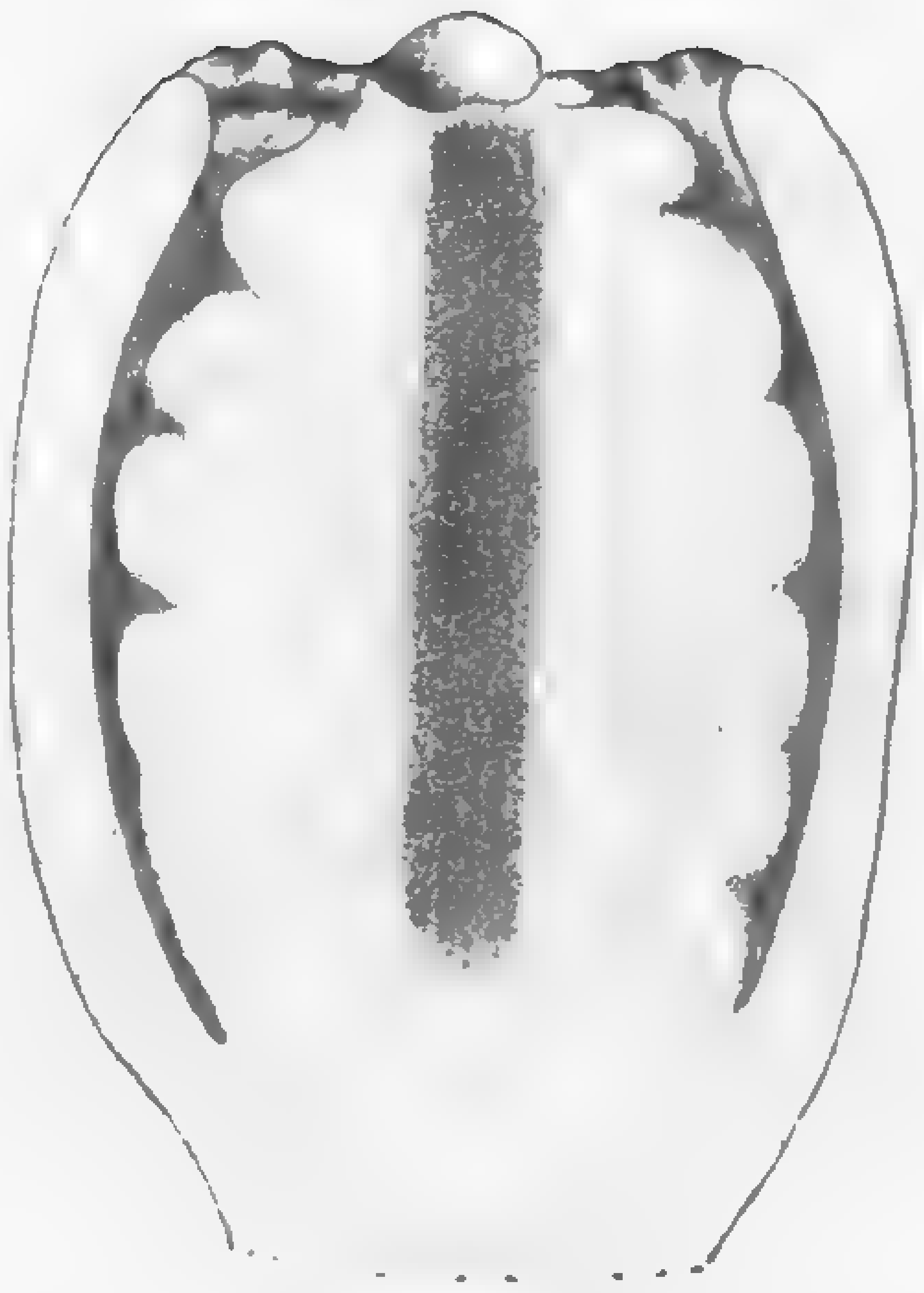

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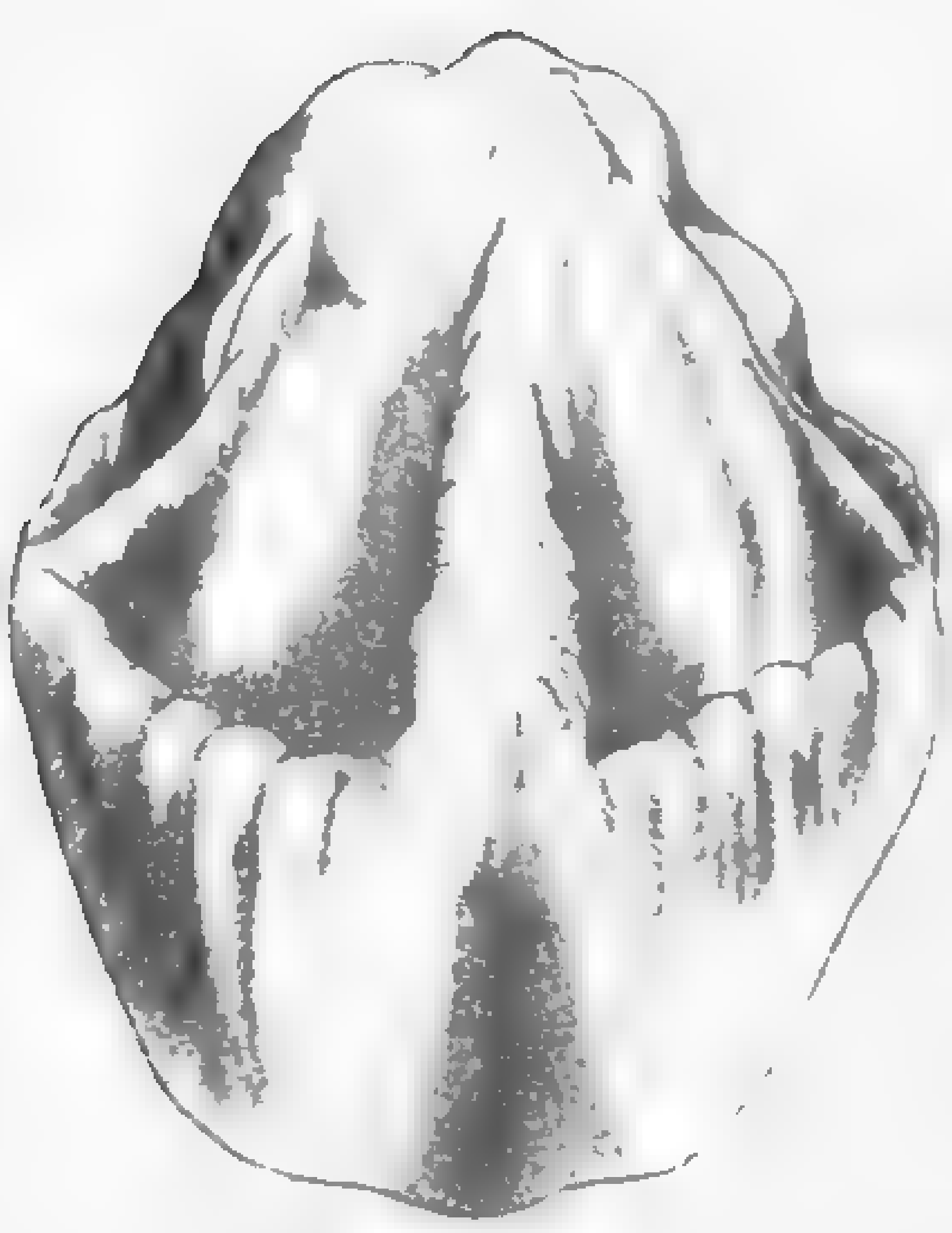

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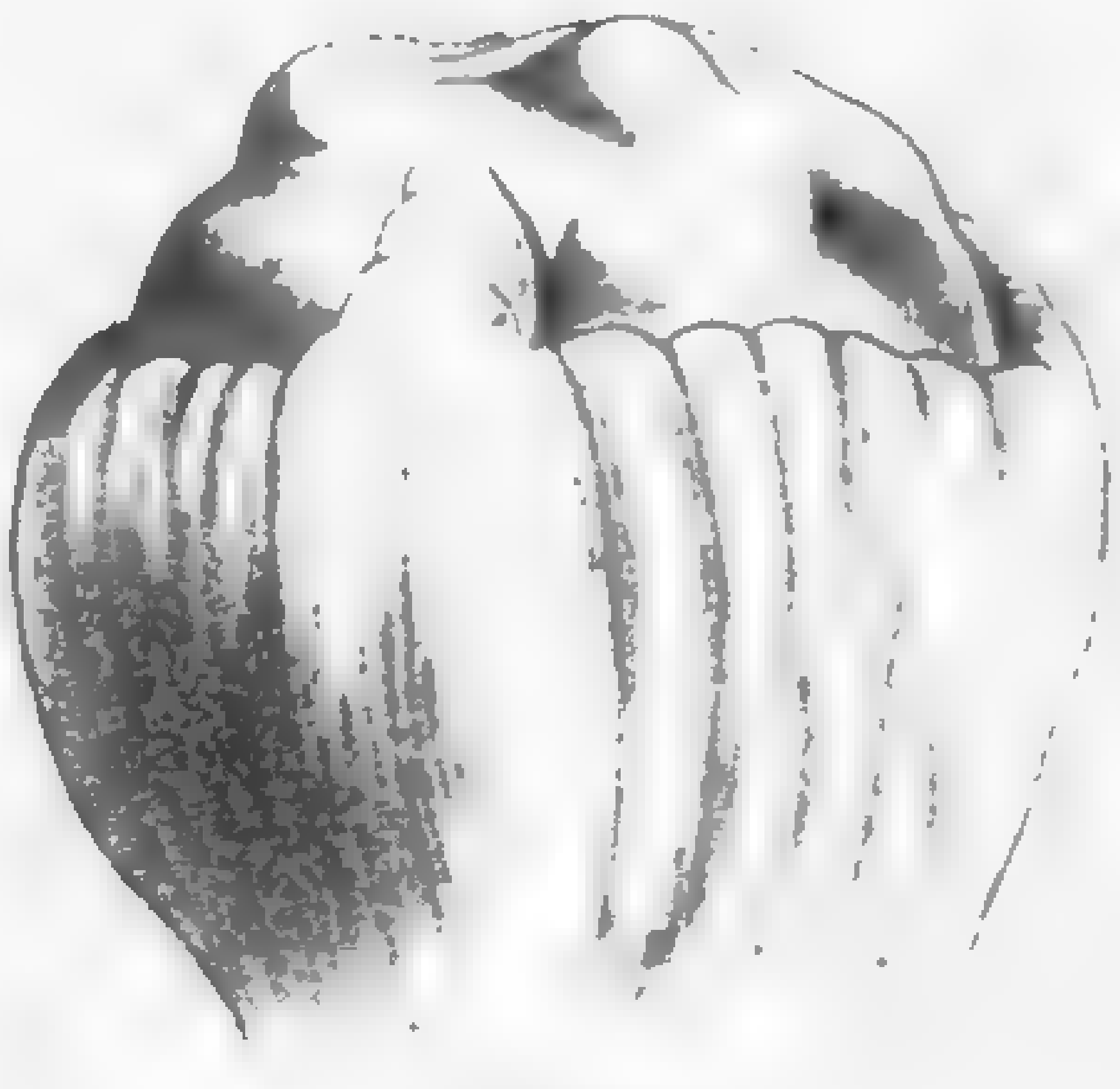

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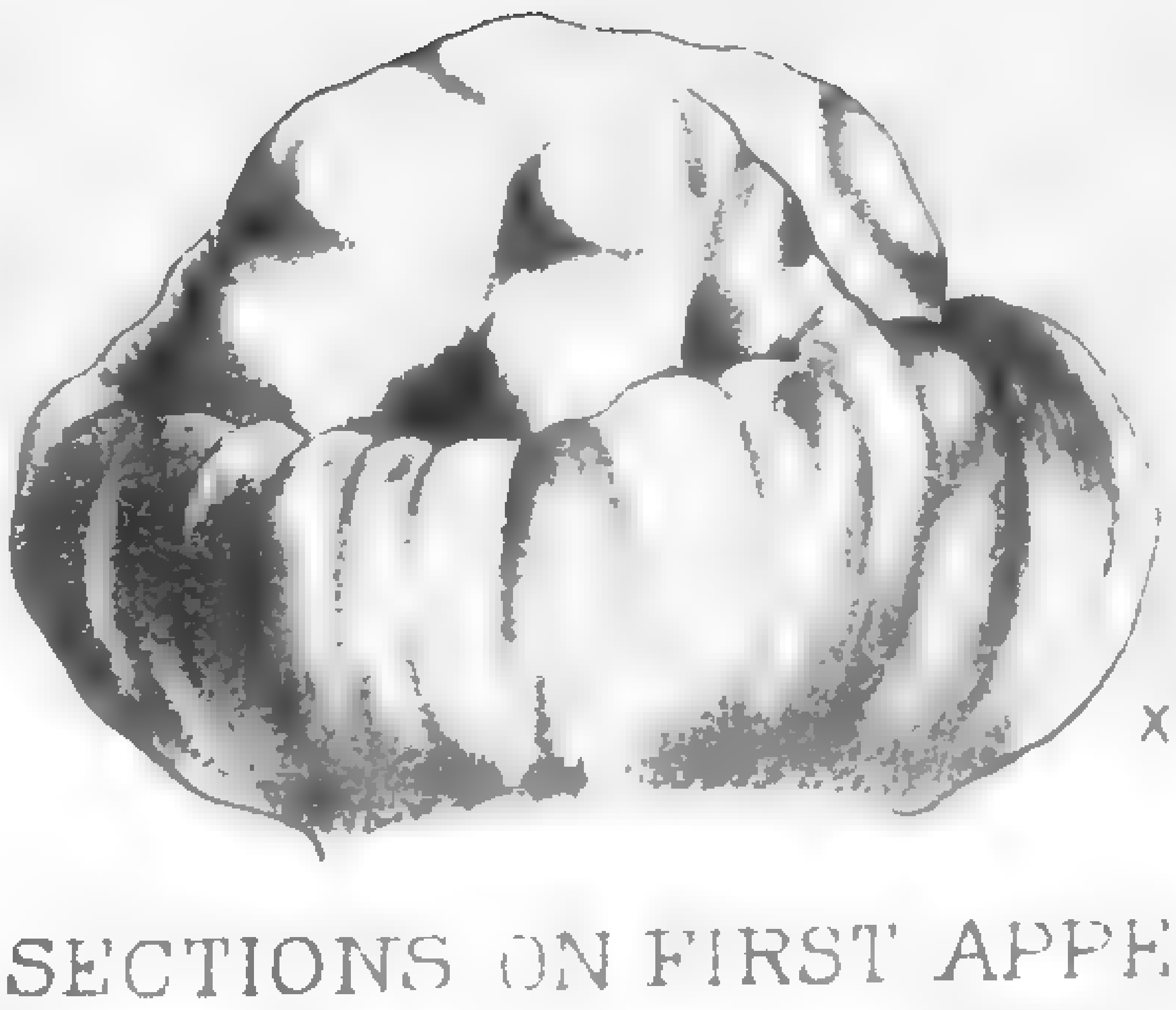


CAPSULES & LONG SECTIONS ON FIRST APPEARANCE OF OVULES.
1. DIANTHUS 2. LYCHNIS 3. SAGINA 4. SPERGULA 5-6. ARENARIA.
7-8 STELLARIA 9 CERASTIUM

G. Lister del.

L. Williams lith.

W. Hood Fitch lith.

Hanhart imp.

RHYNCHOPETALUM MONTANUM

W Hood Fitch lith.

Hanhart imp.

RHYNCHOPETALUM MONTANUM

F.O.Bower del ad nat.

1
2
3
4
5
6
7
8
x
y
z
a
b
r
lat. rt
×20
×2
×3
×30
xylem
cambium
phloem
y or z

Berjeau lith.

RHYNCHOPETALUM MONTANUM.

Hanhart imp.

J. R. Green del.

3.
1.
2.
4.
6.
5.
8.
7.
9.
15
10
11.
12.
13
14
17
16.

E. Carter lith.

ORGANS OF SECRETION IN HYPERICACEÆ

Mintern Bros imp.

J. R. Green del.

19
18
20
25
21
24
23
26
27
28

E. Carter lith.

ORGANS OF SECRETION IN HYPERICACEÆ.

Mintern Bros imp.

Mrs Baker del. SOLANUM TUBEROSUM, L. Fitch imp.

Mrs Baker del. SOLANUM MAGLIA, *Schlecht*. Fitch imp.

Mrs Baker del. SOLANUM CARDIOPHYLLUM, *Lindl.* Fitch imp.

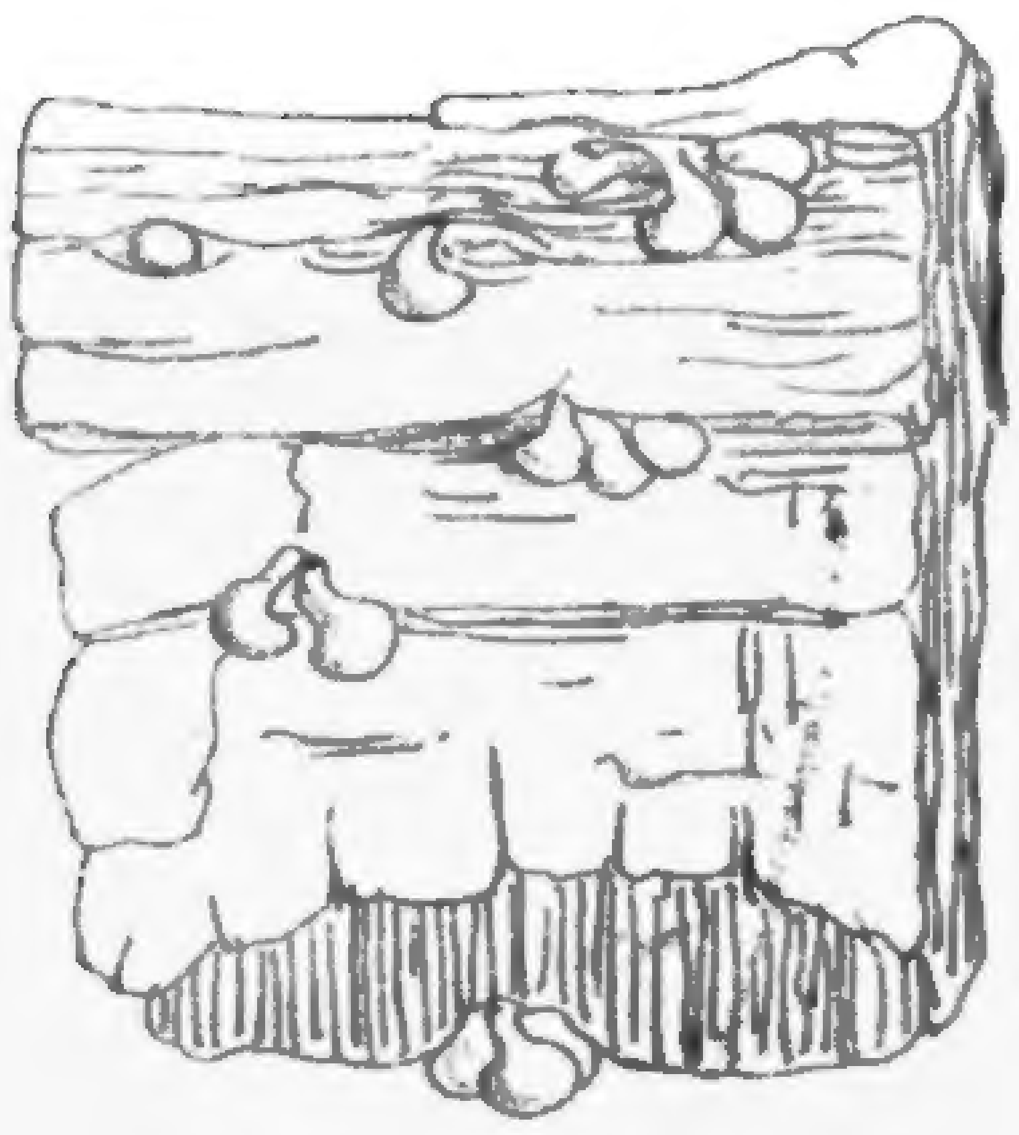
M^rs Baker del.

SOLANUM COMMERSONI *Dunal.*

[illegible]

Mrs. Baker del. SOLANUM JAMESII, *Torrey*. Fitch imp.

J.N.Fitch lith. SOLANUM OXYCARPUM, *Schiede*. Fitch r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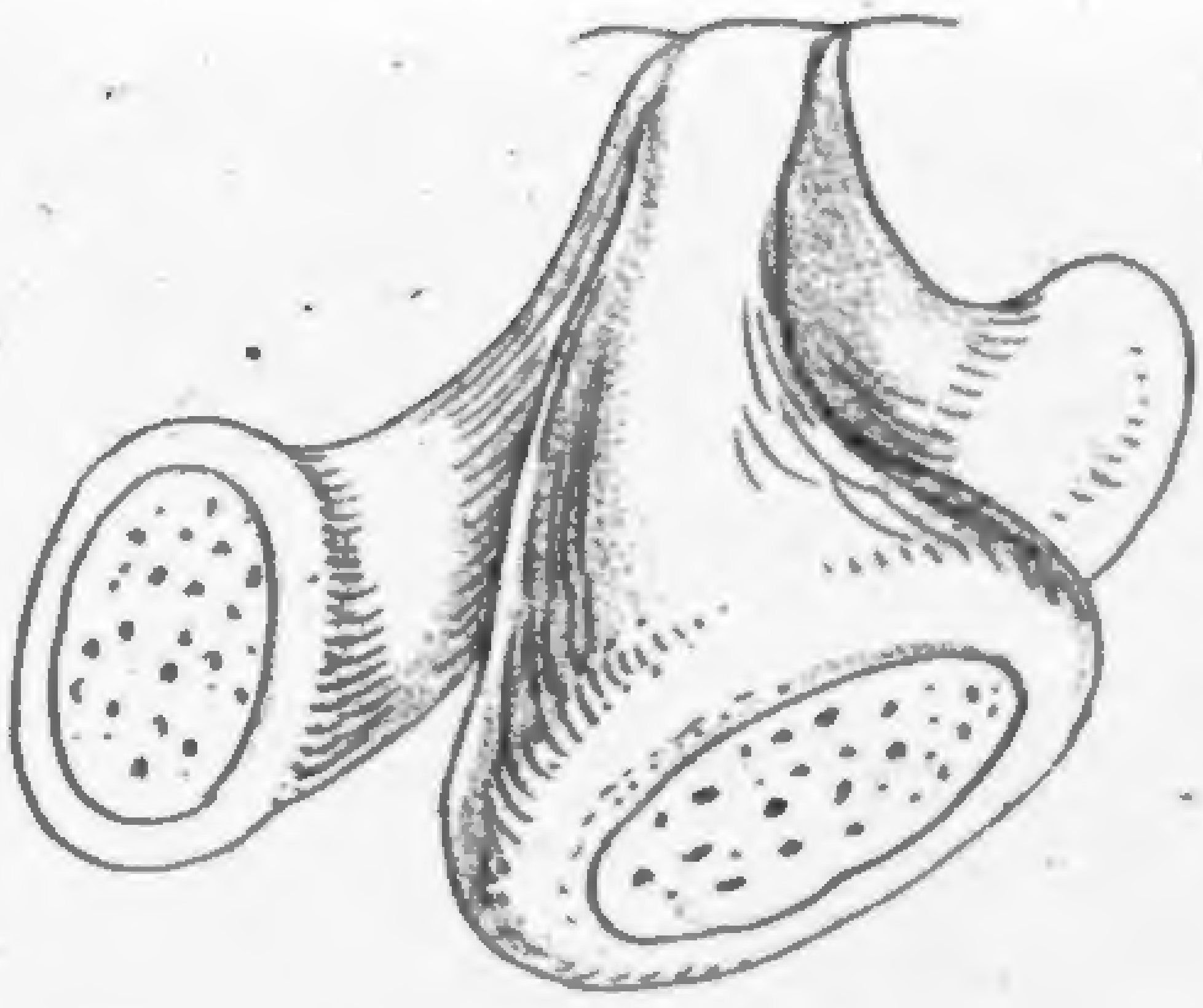
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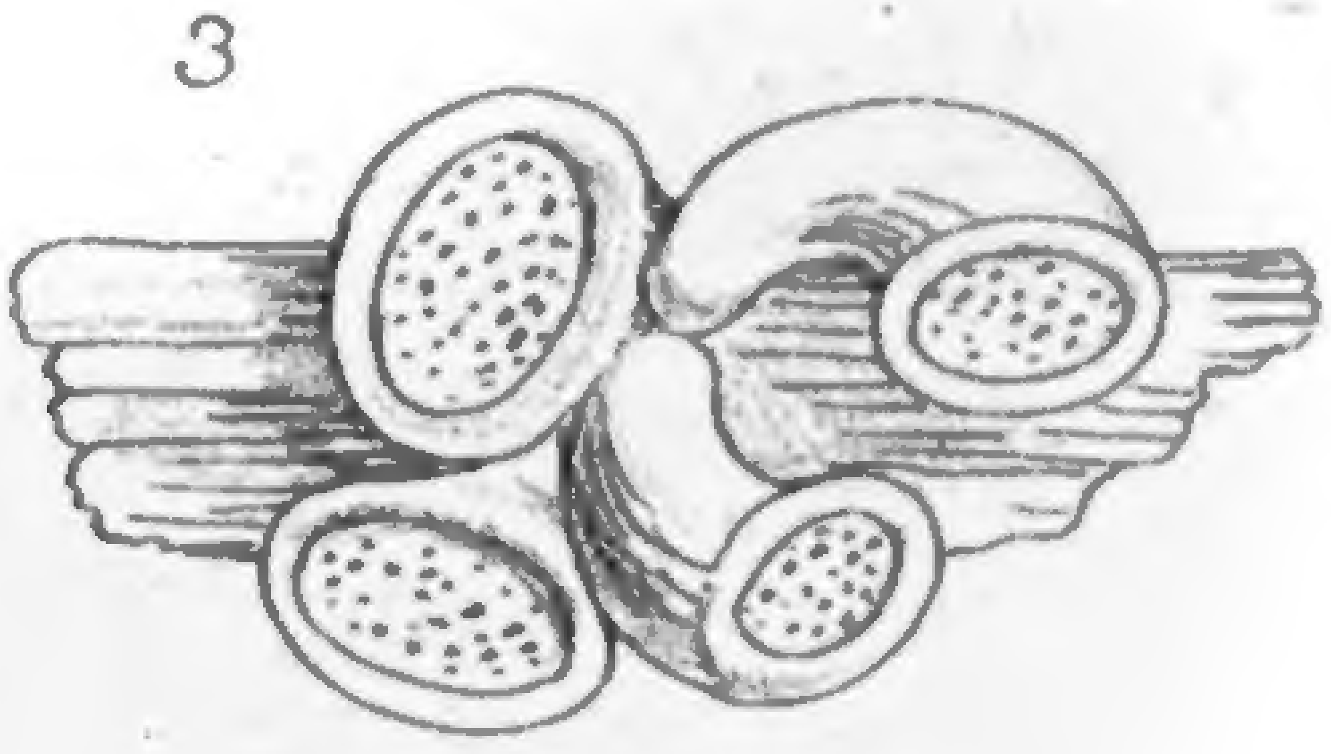
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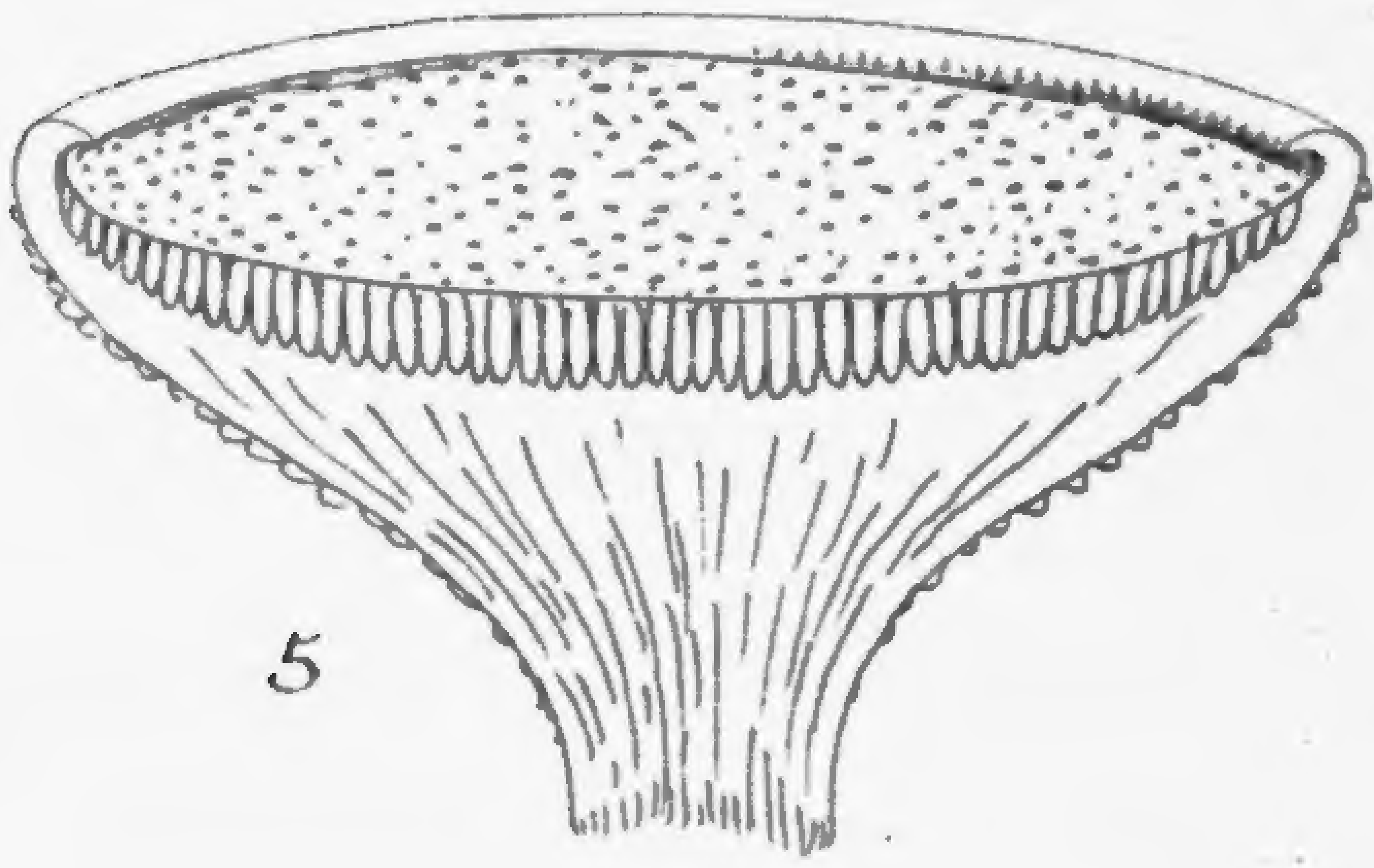
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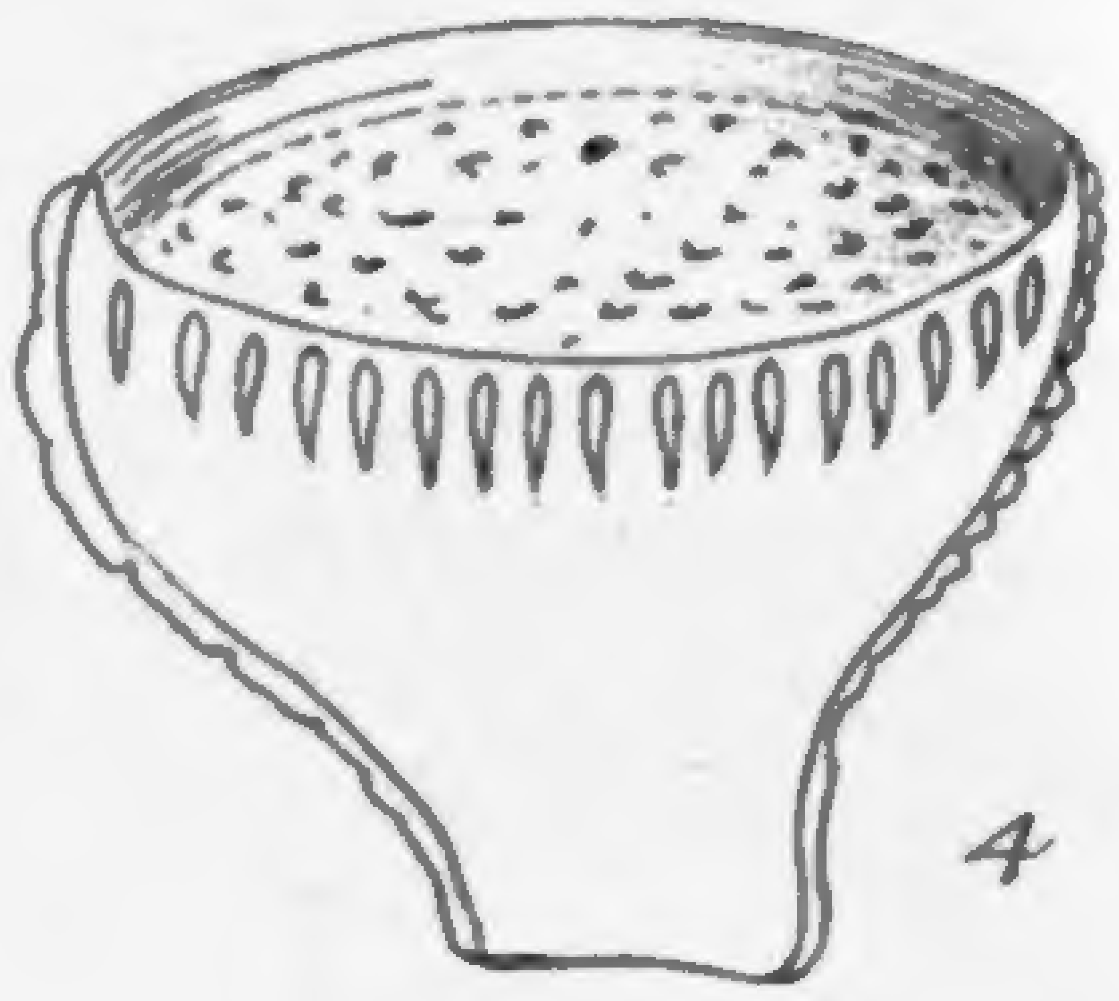
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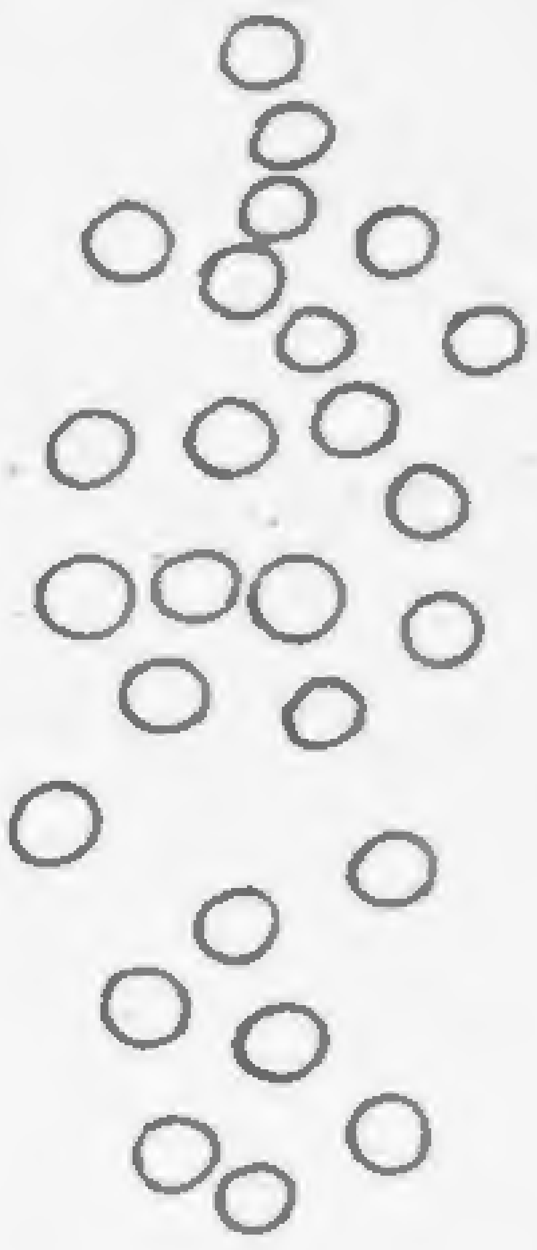
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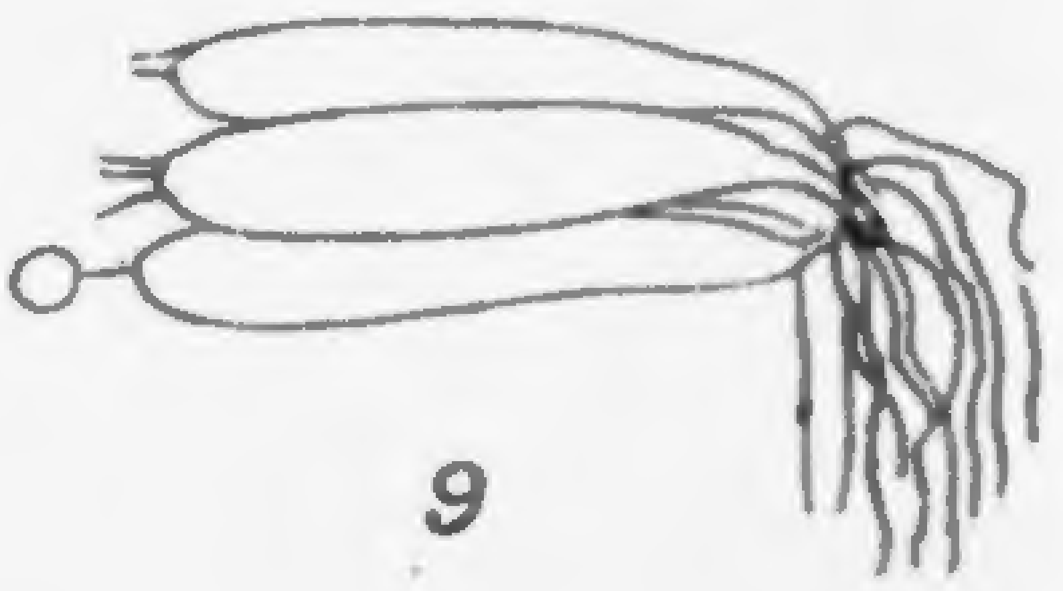
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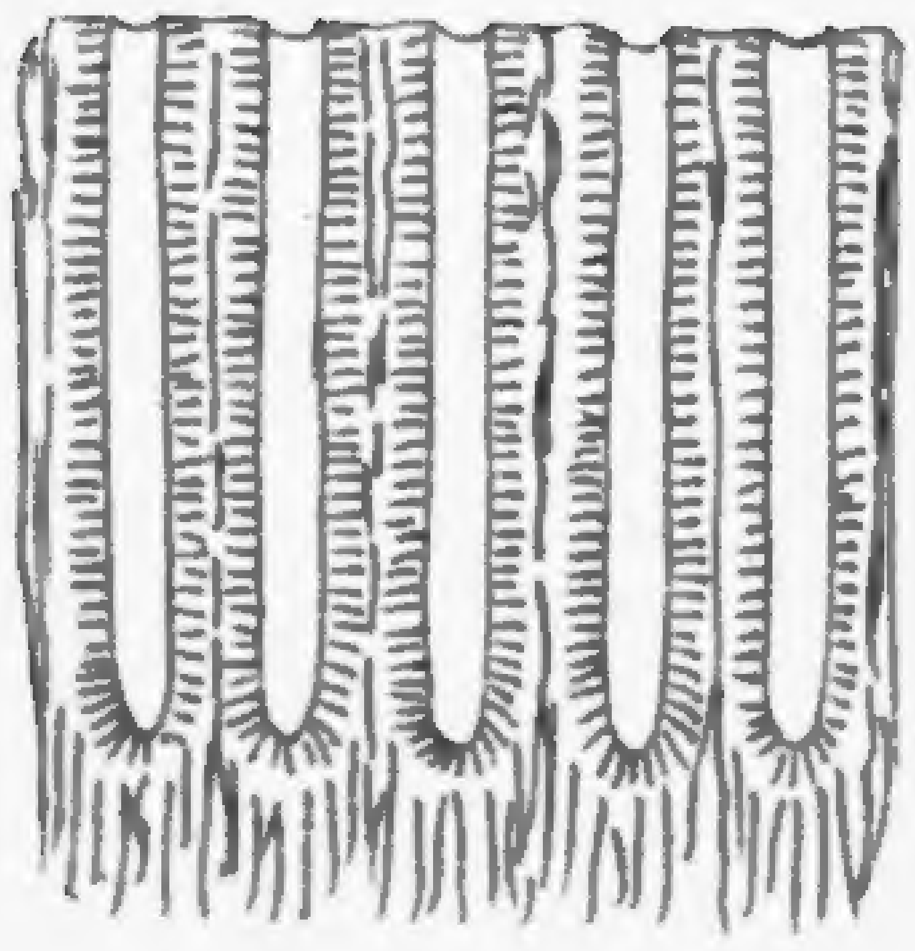
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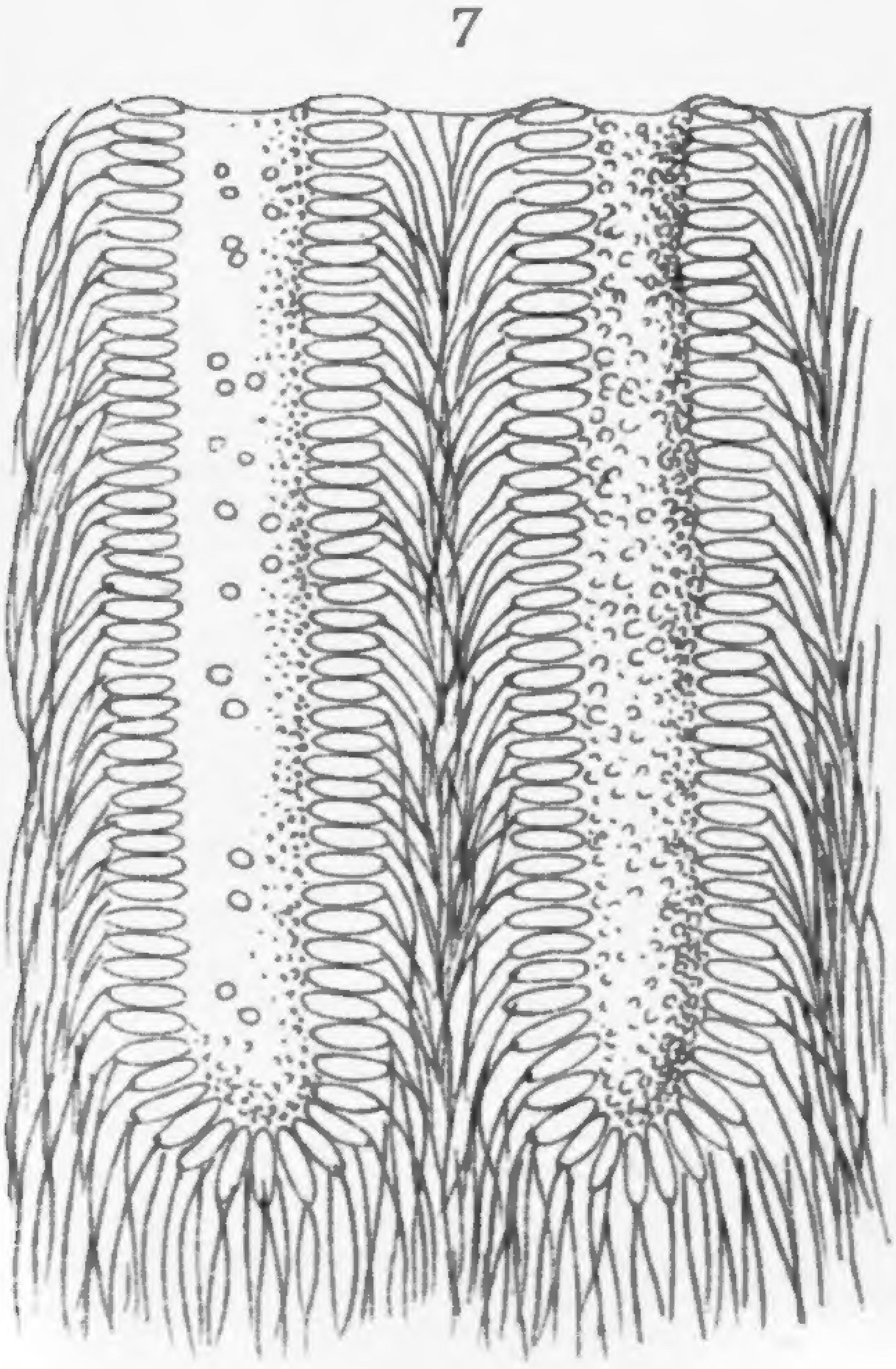
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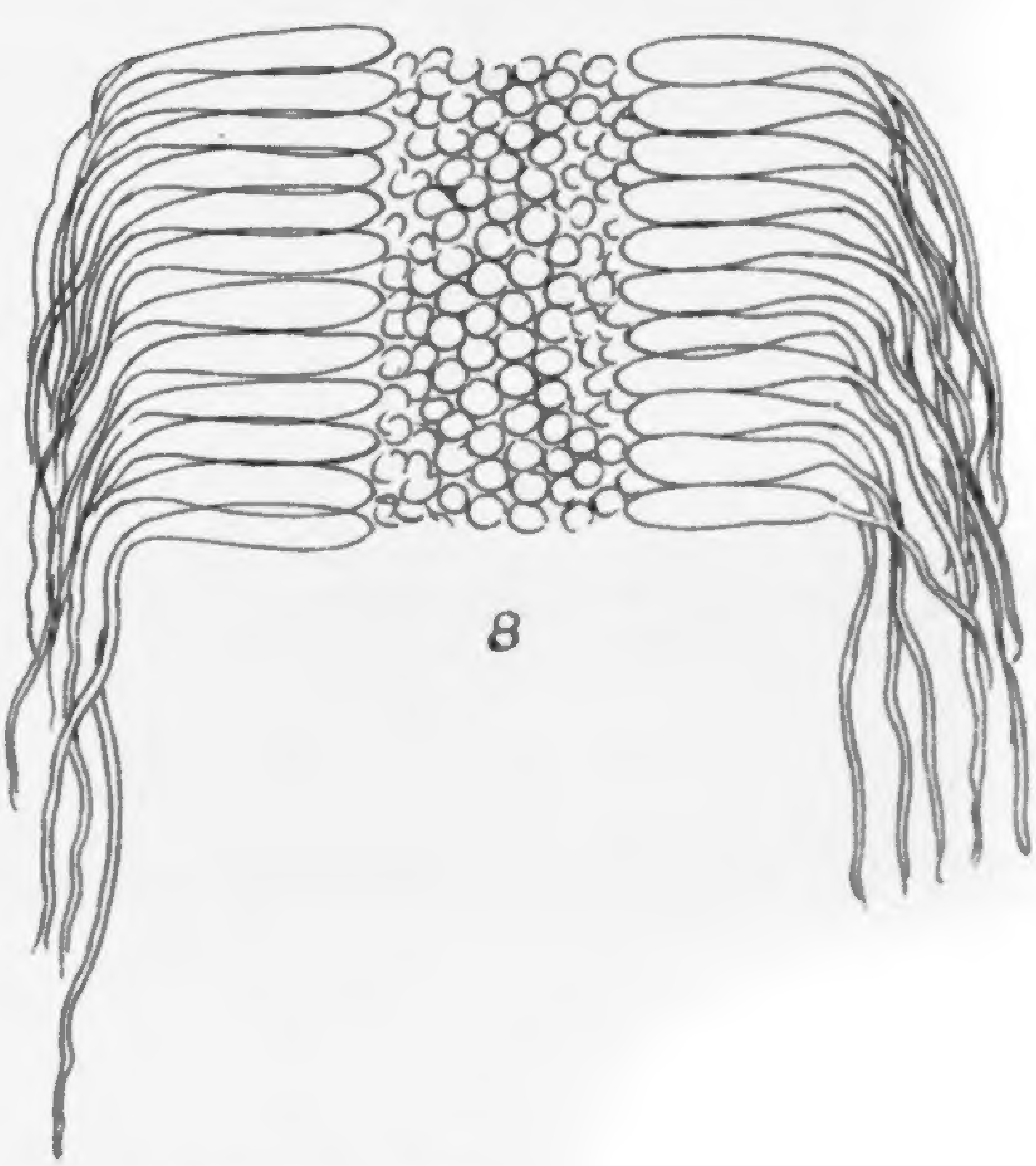
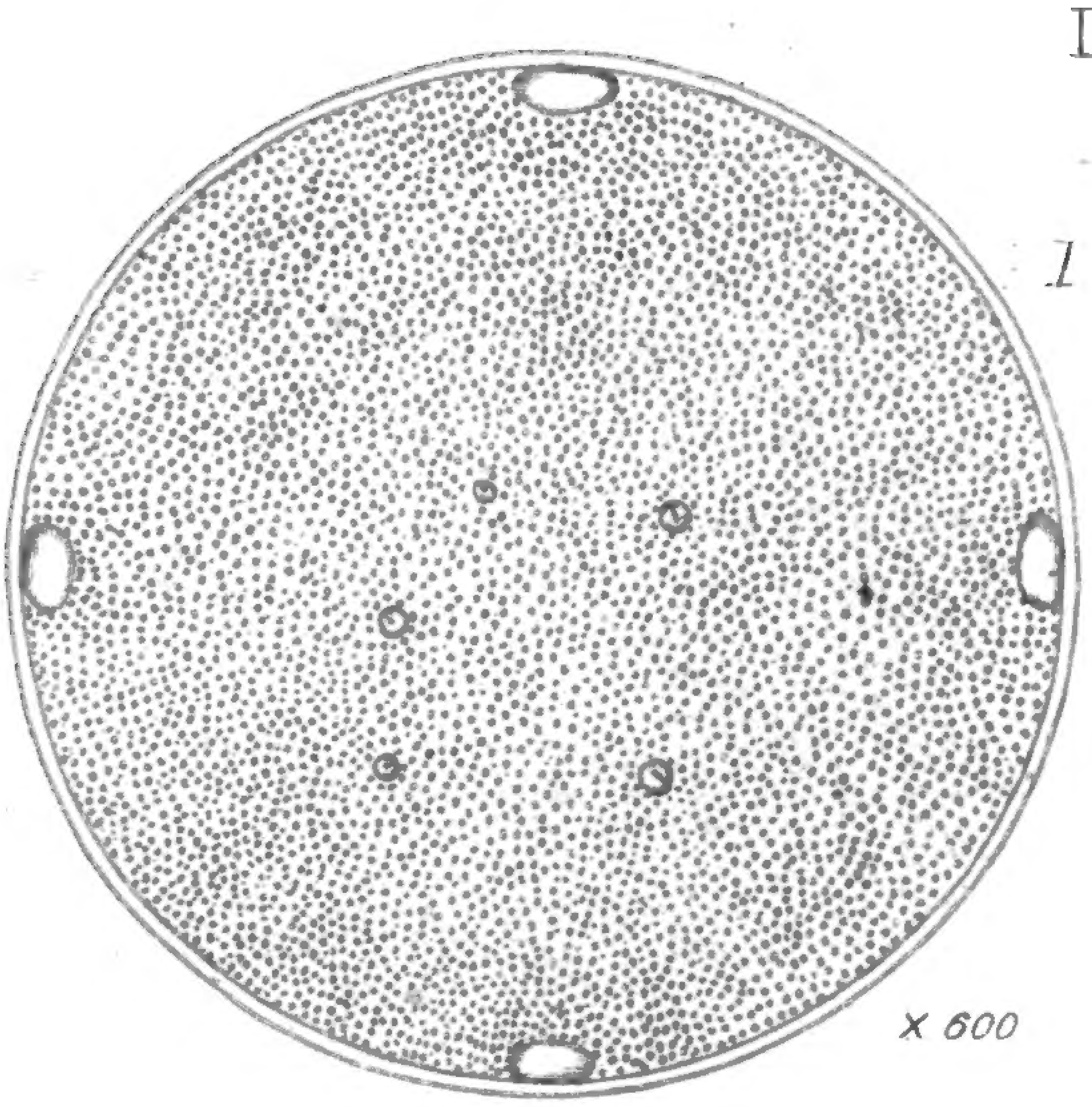

8

8.9.10. x 500.

M.C.Cooke del. POLYPORUS (MESOPUS) POCULA, (*Schwz.*) J.N.Fitch lith.

1



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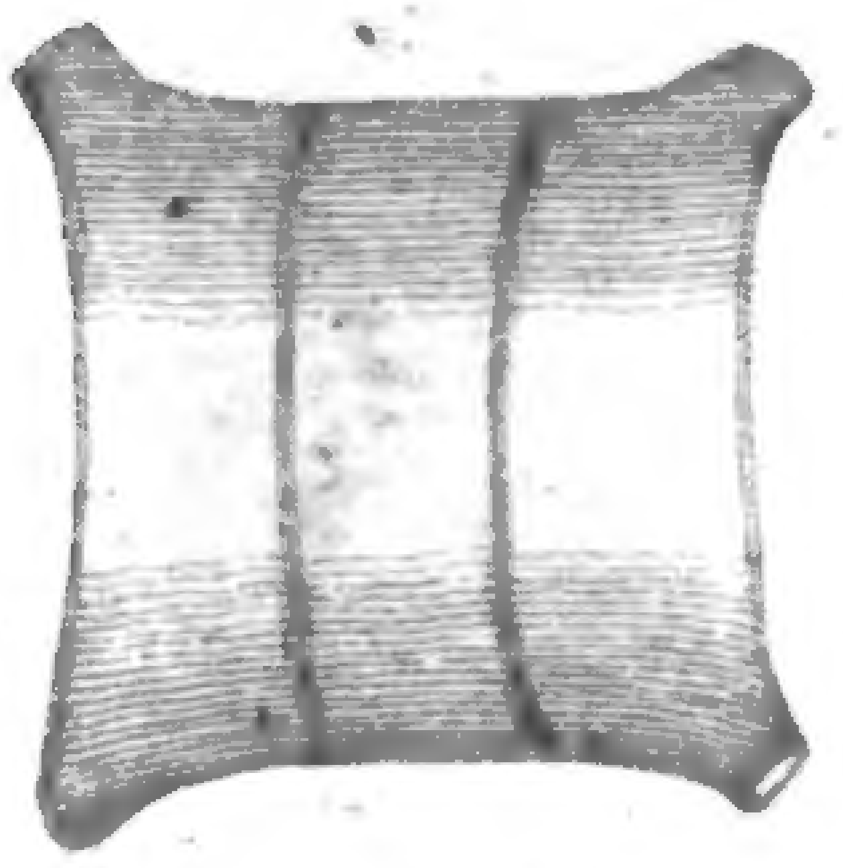

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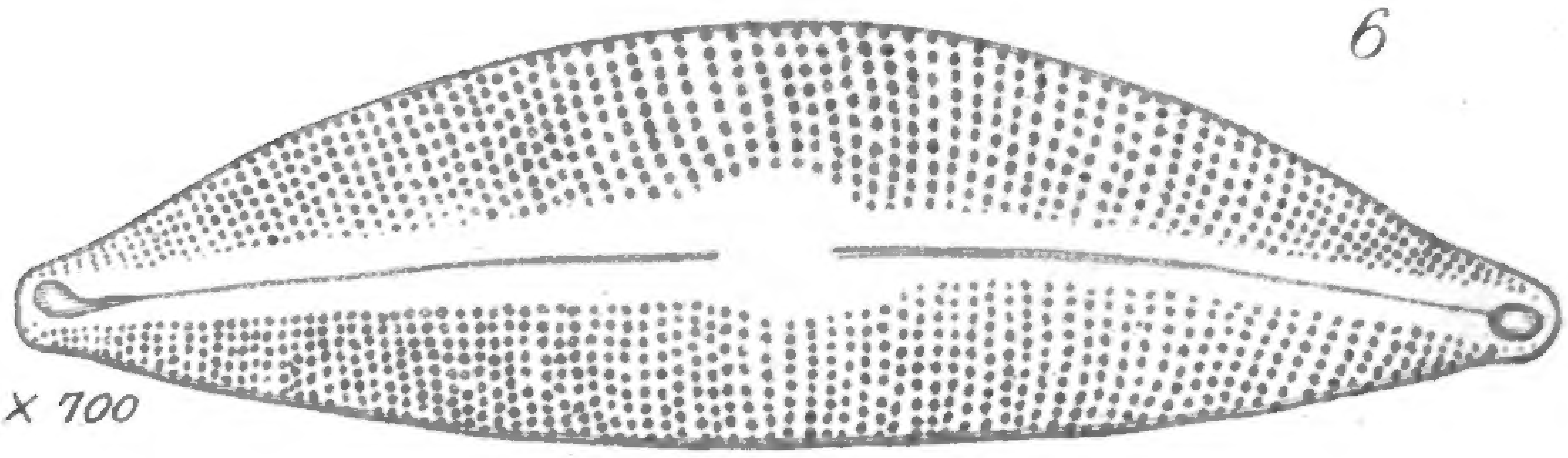

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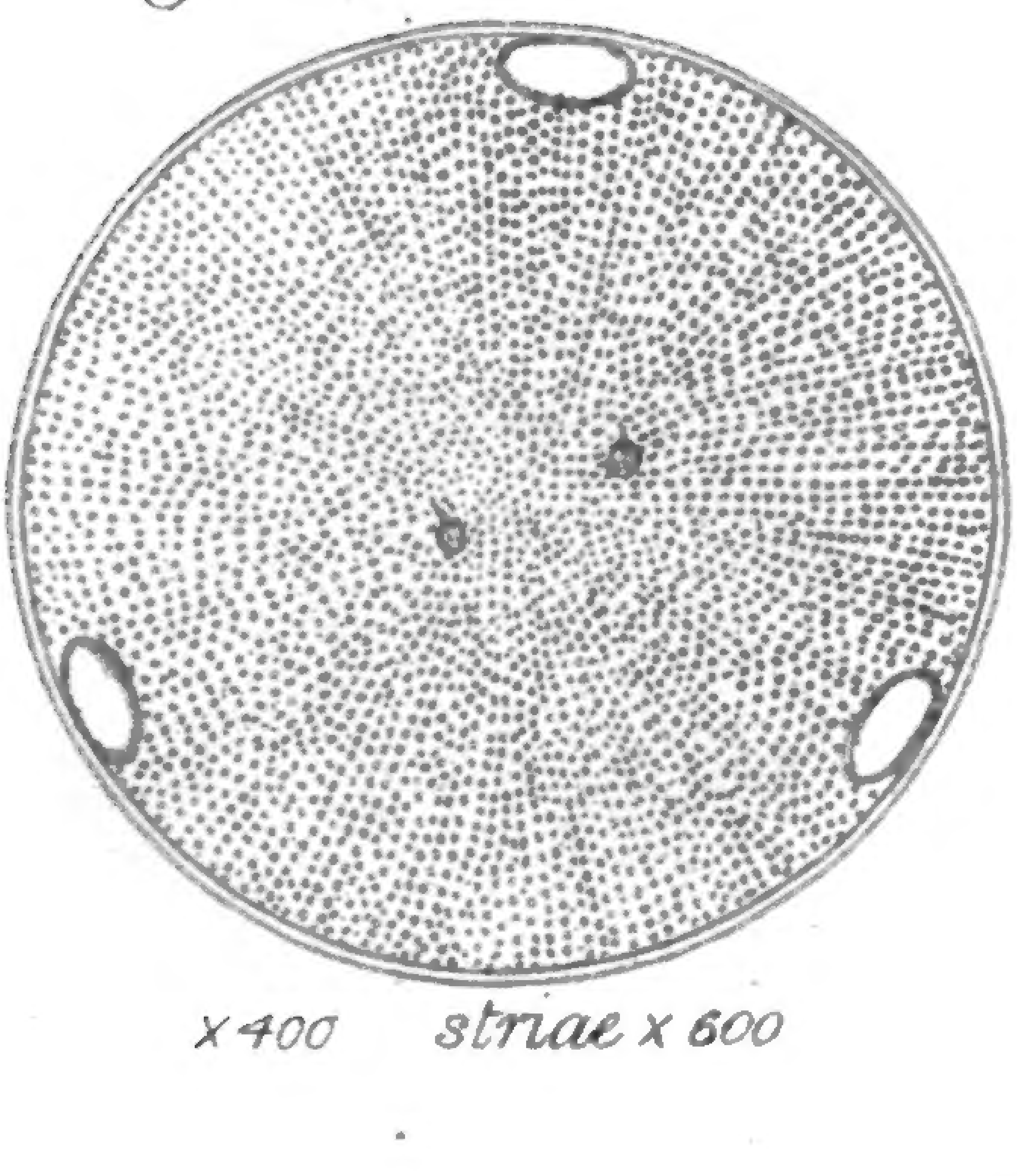
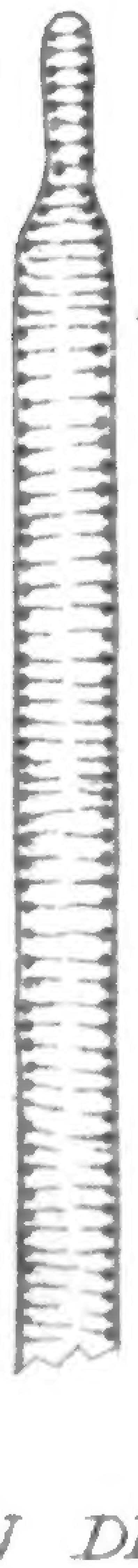

x 400 striae x 600

5



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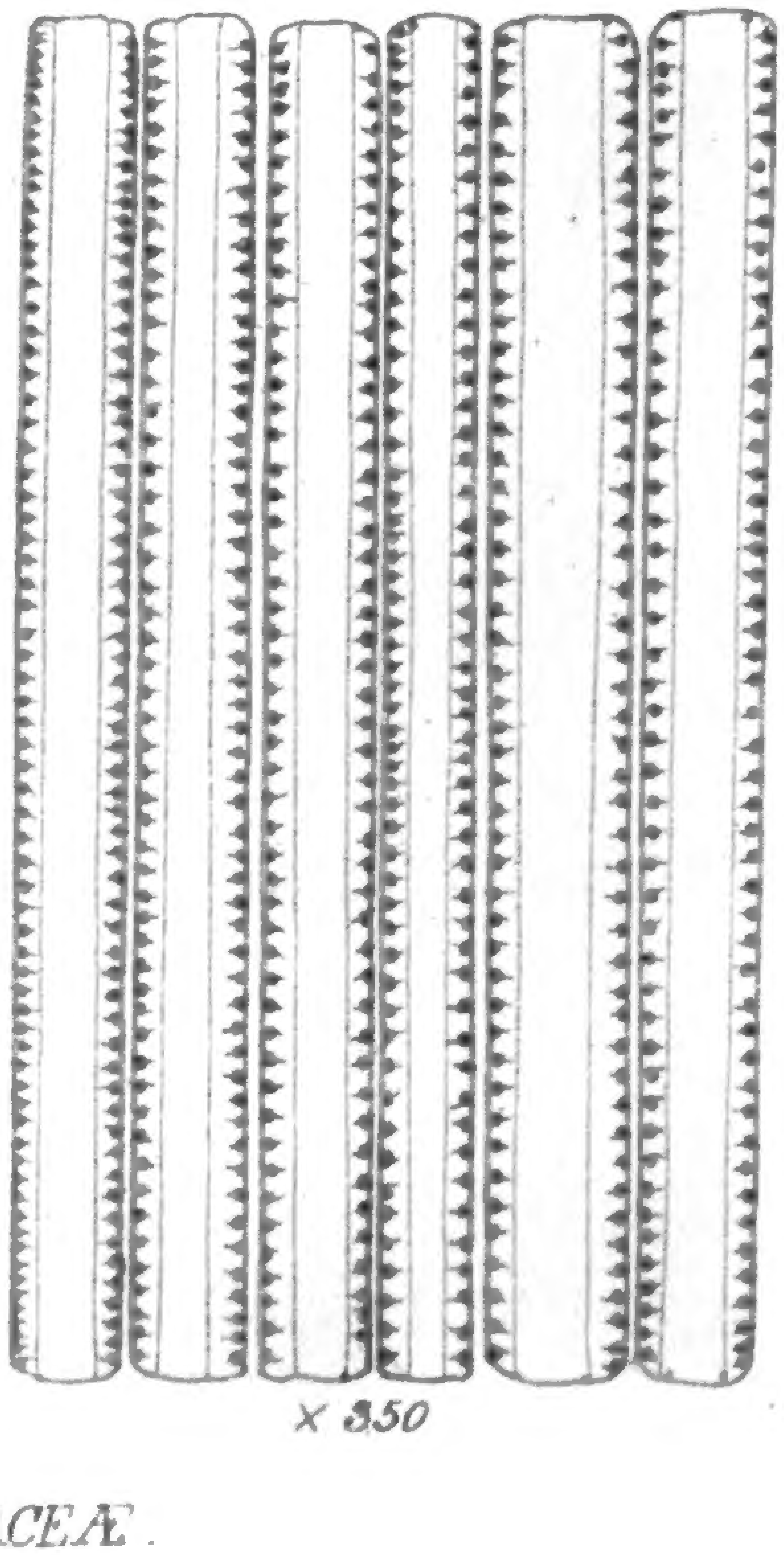

T. Kitton del.
G. Jarman sc.

SOCOTRAN DIATOMACEÆ.